amateur radio

VOL. 43, No. 10 OCTOBER 1975

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COVER PHOTO

Major Darryl Slade, Ops Officer 2 Sig Regt, Corporal Robert Linton, and Sergeant Barrie Edwards, both of the Radio Troop, discussing plans for the erection of antennas for AX3SIG. See story on page 4.

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

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amateur radio

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QSP — *ONE WIA*

We often hear the question, "why are there two WIA offices in Melbourne when one should be cheaper and more efficient?"

In order to refresh memories and bring newer members up to date, may we go back in history a little. In the late sixties it became obvious that the Institute was not able to cope with the increasing complexities of amateur radio unless paid assistance at a high level of competence was made available. This does not reflect on the paid divisional staffs in VK2 and VK3, who could handle the administrative work, under voluntary officers. They could not, however, deal on the technical level with more information that has arisen from more countries in the ITU, IARU and the administration that goes with advancing techniques; such as EME Amateur TV Satellites and Repeaters etc. For voluntary officers, the amount of reading material was simply more than could be digested, so essential work was not done. Thus newer techniques were essential, and must be developed if Amateur Radio is to justify the frequency space it now has. Newer countries' administrations without the background of the development of radio by amateurs are simply unimpressed by need for the spectrum resource that we hold, if we just use the frequencies for ragchewing.

Federal Council authorised Executive to proceed with the appointment of a suitably qualified officer, and in addition it would be responsible for the publication of "Amateur Radio", centralised membership records and "Magpubs". Arrangements were made with VK3 for Executive to rent space in the VK3 rooms at Victoria Parade.

Executive VK2 and VK3 divisional officers agreed on the appointment of the present Secretary Manager, and he commenced duties at Victoria Parade in early 1971.

It was quickly found that he was overworked, voluntary officers who had done a fine job for the Institute felt that the Secretary/Manager was better informed on day-to-day matters by the nature of his work, and consequently passed their duties over to him as quickly as possible. In addition, having to supervise the VK3 division office, led to conflicts between executive and the division, and accordingly the Secretary/Manager had to deal directly with VK3 members, who called for QSL cards and publications, but felt that they should talk to him. Naturally, this was a "not unpleasant" past time, and no doubt good PR but it led to him having to work at night on Executive work.

During 1972 we received the first EDP centralised records, and those who have dealt with initial EDP programmes know the bugs and frustrations in getting them operational. The WIA programmes were no exception, and making them work added to the conflict that had been developing with VK3 Council.

It quickly became evident at this stage that the activities of division executive must be physically separated, as the joint operation was about to break down. Accordingly, Executive moved to Toorak, despite the seemingly increased costs that would be incurred.

This separation has certainly improved relations with VK3, and has led to a better definition of duties between executive and divisions. The Executive office is now free to pursue the objectives of council and executive, and now has the same relationship with VK3 as it has with other Divisions.

This is a somewhat simplified explanation of the past, but now what of the future? We are not sure that costs necessarily would be cut by sharing the same or adjoining office space. Because of the nature of the activities, the VK3 council would need to adopt a "strong line" to prevent the Executive office from appearing to take over the Division. Executive would not want this, but the fact of full time availability of Executive staff would give this appearance, and this would lead to conflict again as in the past. Historically, Australia is a country where "State's Rights" predominate, and the Institute is no exception.

I would like to suggest that we give consideration to a better administrative concept of the Institute. This could well take the form of regions. Radio waves do not respect "State Rights" and a group cutting across state borders may be more appropriate e.g. Brisbane and the Gold Coast, Albury-Wodonga, Mildura-Broken Hill and border areas of South Australia. Groupings such as these could be more efficient and productive of amateur radio activity and development, than the existing capital based divisional arrangement.

The EDP is now proving very effective on the records side, and we aim to improve the accounting as finance becomes available and could well provide the administrative base for future development.

Members should discuss the future of the Institute between themselves and at meetings, so that we can have fruitful discussions and motions at the Federal level on what our development over the next few years should be. We now have a suitable base, let us develop it in the interests of all.

K. V. ROGET VK3YQ
Hon. Federal Treasurer

WIANEWS

Executive have been looking into ways and means whereby properly qualified amateurs could take their part in assisting the Regulatory and Licensing authorities in amateur examinations.

Attempts to persuade the authorities that amateurs should themselves conduct the simpler exams have proved as unsuccessful as in numerous other countries.

Equally unsuccessful were attempts to secure exemptions — particularly in Novice exams — on the grounds of passing other equivalent (or better) examinations such as might be passed by Y.R.C.S. candidates of a suitable standard.

The future problems of shortage of funds granted to Government Departments, the fact that difficulties may arise for holding certain exams at country post offices (vide Aust. Post now being a separate entity) and the concentration of staff in the capital cities are very real problems.

The Institute therefore has considered that a submission should be made for full licensees in certain country areas and possessing such professional qualifications as for example, enables them to perform duties under the Evidence Act, should be put on a register for supervising or invigilating amateur examinations in country areas not directly served by staff of the Regulatory and Licensing Branch.

It is hoped that such amateurs would be willing to undertake these responsible duties acting in accordance with sealed instructions. Such places as Alice Springs, Kalgoorlie and Launceston spring to mind but there are obviously many others.

It appears to the Executive that it could be quite some hardship to expect students applying to sit the Novice Exam for example, to travel long distances for one or two days to attend centres in the main cities. Some alternative seems highly desirable in the light of the greater numbers likely to be interested in the Novices exam quite apart from those in distant places wishing to sit other amateur examinations.

Representations along these lines have therefore been made but it could be some time before any decision is forthcoming. At least the amateur service recognises the problems and is actively pursuing ways and means to have them overcome.

The projected use of Divisional rooms wherein to hold the June Novice examination certainly came as a recognition that the Institute can render assistance. Everything is being done diplomatically to have the knot untied which caused the first Novice exam to be deferred. Whether or not the industrial dispute can be resolved by the Government by the time this appears in print remains to be seen.

That first Novice exam was so near and yet now appears as far off as ever it was. Let us hope that industrial dispute is resolved before it spreads further afield as now appears to be a possibility. (The August exams also have been deferred because of the extension).

The disposal of the funds collected for amateur Cyclone Tracy victims has been passed across to the Darwinites for their views although one suggestion was the purchase of a transceiver for the Darwin Radio Club.

Jim Payne's duties at work and at home have so increased that he has been compelled with regret, to give up being Fed. Contest Manager, although he will handle the administrative work of the 1975 R. D. Contest all being well.

FCM's work is very time consuming and a replacement is being arranged as soon as possible in VK3 where the Contest Committee has some time to remain before passing in rotation to the next Division (VK2).

Another vacancy on the books is Federal EMC Co-ordinator.

The savage increases in postal charges gives food for thought and ways to economise.

AR seems "safe" until February 1, 1976, after which we might pay a cent or two more depending on gross weights.

Sending out subscription notices and later on the final notices will hit hard. There'll be very little change, if any, outlay $1000 on postages alone unless we could dispense with the final notices. This is a Divisional matter.

Magpubs will be hit with increased parcel rates which will have to be passed on. By the way new lists should be ready when you read this. Send for one right away, but PLEASE send a self-addressed stamped envelope. Only about 5 letters can now be sent for a dollar.

If members would kindly send self-addressed stamped envelopes with their enquiries this would help enormously in keeping costs down.

Another area of possible economy looked into was the wrapper or envelope for AR. For technical reasons we cannot use plastic envelopes. Equally we can find no way of having the wrapper stapled to AR as an 'outside cover'. We are felt with the present envelope system of returning to the old wrapper around a folded AR. Since the final costing differentials are not too great, it has been decided to stay with the present envelope system. Presentationally it is a better system also.

Would you really like a bumper issue of AR for December? This could become a certainty if enough advertising comes forward. ■

GOLDEN JUBILEE 1925-75 OF THE ROYAL AUSTRALIAN SIGNAL CORPS

To celebrate the above Jubilee, the RACS will establish an Amateur station to operate world-wide from the Watsonia Barracks, Macleod, Victoria, from November 3, 1975, to November 10, 1975, inclusive.

A special call sign AX3SIG has been allocated for this occasion.

The station will operate on all of the most popular Amateur Bands. Modes will be, 1.8 MHz using 150 watts input on AM, and 3.5, 7.0, 14.0, 21, 28 MHz using 400 WATTS PEP *UPPER SIDE BAND* (in all cases). In most instances the station will operate essentially on phone, however, there will also be CW operation included, and it is also hoped to provide RTTY facilities (this detail was not confirmed at the time of printing). 2Mx FM Simplex and repeater operation will also be a feature of the celebrations.

The station will operate 24 hours daily for the entire period.

A special QSL card is to be printed and inwards QSL cards may be sent to the VK3 Inwards Bureau or direct via QSL Manager VK3ZA, C/o Box 134, Mt. Eliza, Vic., 3930.

PUBLIC DISPLAY

On the weekend November 8 and 9, 1975, the station will be on display to the general public at the School of Signals within the barracks.

A museum of Service Radio and communications equipment will be displayed, and it is anticipated that the Governor General will be in attendance to officially open the museum.

A REQUEST FOR ASSISTANCE

To assist the Royal Australian Corps of Signals, establish the museum, amateurs and SWLs are asked to either donate or loan the museum suitable items of ex-service equipment for the display.

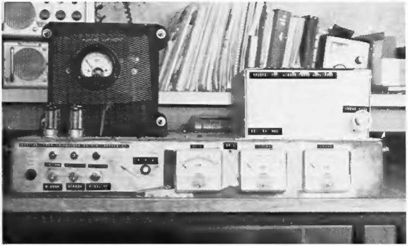
If you can help in this regard please contact Lieutenant Colonel John Bennett (VK3ZA) in the first instance by telephone (03) 787 1325 or letter C/o Watsonia Barracks, Victoria. Please note that freight on equipment donated or loaned will be paid for at the army's expense. Please act *now* if you can assist. ■

QSP

MORSE TAPES

A note from the WIA NSW Division tape service advises that C90 morse code cassettes are available (2 cassettes covering introduction, then 5, 6, 7, 8, 9, 10 wpm) on maximum two months loan at $3.00, plus, $5.00 deposit, plus, $1.00 extra for Interstate posts (prices subject to change). This charge also appears to cover 5" reels at 3¾ ips, lectures on 7" reels are also available as well as slides. The address is Mr. K. Black, P.O. Box 43, Erskineville, NSW., 2043. Phone (02) 516 3673 AH. Prices are subject to change without notice.

METEOR SCATTER LINEAR



Steve Gregory VK3ZAZ
Gear Avenue, Mt. Helen, Vic. 3354

After a season of sporadic "E" DX, it has been discovered that a few extra watts is most effective to work anything going. However, of the multitudes of stations worked during 1973-1974, only a few have been heard during the winter months, and these few all ran high power.

To embark on the project of a high power linear amplifier, it is first necessary to pass on a common warning. The tube used operates at voltages which can be deadly, and your equipment has to be designed properly so that *NO* contact with high voltage can occur. Use safety enclosures for all high voltage circuits and terminals, use a substantial bleeder to ensure instantaneous bleed-off the capacitor reservoir voltages, and if you *must* operate with RF and probe the caged area, have another person present during that time. Remember at 2000 volts and 1 amp, you do not get a second chance.

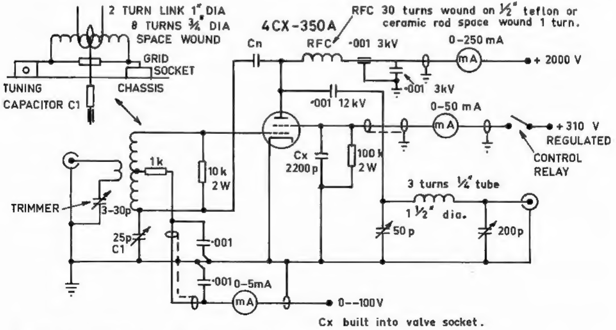
In this project the choice was the Amperex 4CX-350A external anode tetrode, but the mechanical layout caters for 4X150 or 4X/CX250 tubes also. The reason behind the choice was a higher available plate dissipation and the linear design characteristics of this model.

Greater flexibility will be obtained by use of the other tubes mentioned, especially should AM or FM operation be contemplated.

On the subject of the socket, it is essential to obtain the correct socket for the application, and in this case an EIMAC SK-600 series with an EIMAC SK-606 chimney will ensure correct air-flow and circuit stability.

COOLING

Sufficient forced air must be provided



A LINEAR FOR METEOR SCATTER DX

for the anode, base seals and body seals to be maintained below the rated values.

Plate Dissipation	Air Flow (CFM)	Pressure Drop
200 watts	5.0	0.52 in.
250 watts	6.4	0.82 in.
350 watts	7.8	1.12 in.

The blower selected in a given application must be capable of supplying the desired air-flow at a bank pressure equal to the pressure drop shown.

For reliable long-life, the cooling air-flow must be maintained during stand-by periods, when only heater volts are applied.

The rated filament voltage is 6.0 volts and should be maintained as close as is practical. Short time variations ±10% will not damage the tube, but variations will occur in performance. To minimize variations, try to hold the level within ±5%.

If you are unsure of your operating conditions, then contact the suppliers of your tube for application ratings or write to the author for possible assistance.

DESIGN

Reference to RSGB and ARRL publications have no real design parameters because each user had his own way of putting things together.

Commencing with the grid input stage, the RSGB idea of a grid swamping resistor and a tuned circuit to give the required impedance match for the driving amplifier was used.

An 820 ohm resistor was the starting value and after neutralisation, this value was increased to 10,000 ohms with no decrease in stability. A sure fire test for your amplifier is to run it in idle conditions and swing the grid and anode tuning through the entire range. You should be able to carry out this action without any signs of movement from any meters.

Second stage of construction was the final tank circuit, starting with the RF choke. This little coil of wire is the secret behind the success or failure of any output stage. After reference to a section devoted to these devices in the ARRL VHF Handbook, a ½ in. diameter ceramic former was chosen, and space wound with 30 turns of 20 gauge enamelled copper wire not the enamel that turns to flux with temperature. The high RF voltage across this choke and the circulating currents cause heating and high stress, so by space winding on a good quality former (teflon or ceramic reliability may be ensured.

The coupling capacitor from the anode is a .001-12,000 volt epoxy set unit available for approximately 80 cents plus tax from trade television outlets. Why 12,000 volts? Read on for the explanation.

The pi-section output is conventional with a choice of capacitors to give a good tuning and loading range. The coil is simply 3 turns of ¼ in. copper tubing wound a 1½ in. steel pipe and then stretched out to 2 turns spacing to resonate at 52 MHz.

Back to the grid circuit; a lead was connected from the opposite end of the grid coil and routed through the chassis toward the anode. Here was the first trick for young players that you find no reference to in any books.

The screen ring of a 4CX tube sits a little above the chassis and it seems that the little bit of grid wire prefers to look at the screen rather than the anode. The remedy for this is a small brass shield approximately ½ in. high and 3 inches long curved to match the circumference of the tube, and fastened to the chassis about ¼ inch away. The neutralizing lead is brought through behind this shield and placed in the proximity of the anode ring. The connection to the anode ring was made around the large fenced area with a small brass tag, and held in place by a standard 1¼ in. radiator hose clamp.

(Other constructors may prefer to use finger stock if they are fortunate enough to have some—Ed.)

To neutralise the amplifier, apply sufficient drive to be detected with some type of RF probe in the tank circuit (no filaments, and of course *NO HV).*

Use a pair of snippers to clip the neutralising wire until *NO* output is discernable in the tank circuit. Check that it is neutralised for well over 500 kHz of operating range.

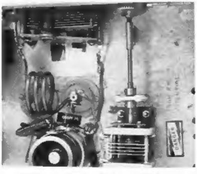
The amount of wire past the shield will be around ½ in. and about the same distance from the anode, ½ in.

FIRING IT UP

The use of a mains variable transformer is very desirable, and in the author's case a switchable decade-screen supply was used and the screen voltage was run up in 10 volt steps. Remember, screen volts with no plate volts will destroy these tubes in less than the time it takes to manually turn the screen supply off, so the inclusion of a control relay, that removes screen volts should the anode volts fail, is highly desirable.

Firstly, check that you have adequate grid control voltage, and that the control that varies this will give you a full range, say —100 to 0 volts.

Apply some plate volts only, with no screen volts. With 2000 volts applied, as you vary the grid bias, around 3 or 4 mA of plate current will flow at zero bias. If that happens you are able to control the electron flow and at least the tube is behaving like a tetrode. At this stage the author's original .001-5000 VW coupling capacitor disintegrated. So the initial check at high volts is a good test of your insulation characteristics of chokes, filters



Tank Circuit of 4CX350A with thermal inertia bronze collar fitted to improve thermal efficiency.

etc. This experience caused the author to select a more conservative rating for the next capacitor.

A point here is that some surge protection is desirable when coming to the high voltage switch-on. A 500 watt radiator resistor on a 4 second time delay relay was used. This relay can also be overridden and the tube run on low power with only 1500 volts applied to the anode. At high power, 2400 volts is used which is 100 volts less than the maximum rating.

With maximum bias applied, activate screen and plate volts, and set the standing plate current at 100 mA, which is the manufacturer's recommendation. Apply drive, and load and tune for maximum power output.

A word on negative screen current for the uninitiated.

The electrons dislodged as secondaries by arriving primaries will be accelerated away from the screen causing a net reduction in the measured screen current. It is possible to have more low energy secondaries leaving the screen than primaries arriving, and when this occurs the current is negative.

An important consequence of this is the need to provide a stabilised low impedance screen power supply which can tolerate the negative current and still control the screen. A zener diode is the ideal method, but for shunt resistance methods, 40 mA bleed per tube is recommended.

Secondary emission varies from tube to tube and in the author's case —4 mA occurs at 150 watts carrier. Increasing the drive further, the current starts to increase to a value of 20 mA maximum at 310V DC regulated, for 250 watts carrier output.

On two tone test at 350 watts PEP out, a similar figure occurs of +27 mA.

The rest of the project is really up to the individual, and power supply design is arbitrary. The author used 866A rectifiers because they are still only $1.00 each and you could blow up a lot of those before you would equal the 22 diodes, capacitors and resistors necessary for solid state. If you do not have a filament transformer rated at 5 volts 10 amps plus a DC rating of greater than 2000 volts, then the cost of that would make a string of diodes in a stack most desirable.

A 5-25 H swinging choke was used with choke input from the rectifiers. The filter capacitors were 3000 volt block oil filled.

The bias is regulated and taken from the junction of an OA2, OB2 combination from the supply line of —200 volts. Grid current in this type of tube is *"verboten"* and should be avoided at all costs. To drive the amplifiers to full output takes less than 1 watt from the QQE03/12 amplifier in the transverter.

It is recommended that a minimum of 30 seconds elapses before applying high voltage after filaments are activated.

(A further precaution that may need to be observed is the provision of a Relay System with a switching sequence that switches on bias, anode and screen supplies in that order after the 30 second warm up—Ed.) ■

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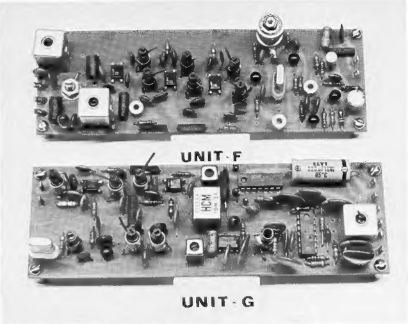
AMATEUR BUILDING BLOCKS

PART FOUR

H. L. Hepburn VK3AFQ
4 Elizabeth St., East Brighton, 3187

Having dealt with the essentially HF modules, attention is given in this article to the basic requirements for VHF FM transmission and reception. Circuits, layouts and other data are given for low power transmitters and physically small receivers which can be steered on to any frequency between 50 and 150 MHz.



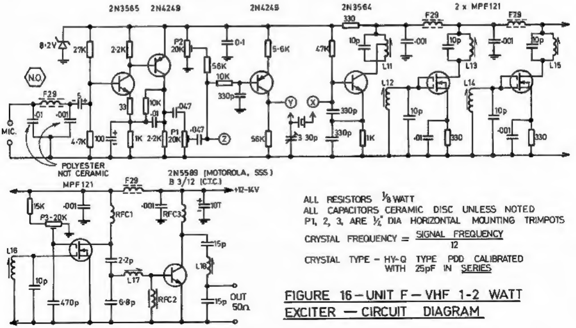
PHOTOS BY KEN REYNOLDS VK3YCY

Section 2 — Unit F —

2 WATT VHF/FM EXCITER

This module is a very flexible unit which can be used to provide up to 5 watts (according to frequency) of modulated or unmodulated output on a single channel anywhere between 50 and 150 MHz. The coil data given in this section is specific to 146 MHz and 52 MHz but simple modification to the tuned circuits enable the module to be used anywhere between these frequency limits.

The basic design is not new, having originally been described by VK3ZBJ and the writer in the April 1971 issue of AR. Its inclusion in this series of articles is in deference to continuing interest in the original design. Four years' experience with the "1971" carphone transmitter has led to the beleif that a physically smaller unit which incorporated the driver stage as part of the exciter proper would be advantageous, as would the ability to vary the output. The module now described can be used as a low power FM transmitter, or the modulator section can be omitted and



ALL RESISTORS ⅛ WATT
ALL CAPACITORS CERAMIC DISC UNLESS NOTED
P1, 2, 3, ARE ½" DIA HORIZONTAL MOUNTING TRIMPOTS

CRYSTAL FREQUENCY = $\frac{\text{SIGNAL FREQUENCY}}{12}$

CRYSTAL TYPE — HY-Q TYPE PDD CALIBRATED WITH 25pF IN SERIES

FIGURE 16 — UNIT F — VHF 1-2 WATT EXCITER — CIRCUIT DIAGRAM

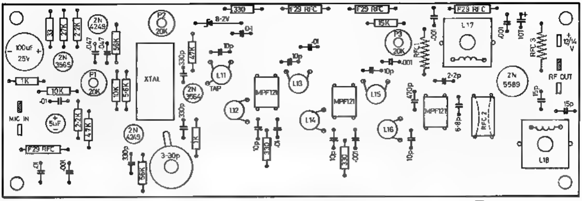
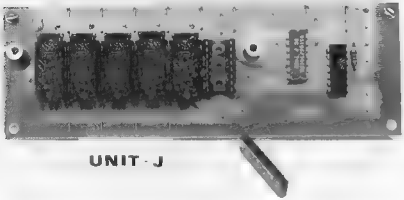


FIGURE 17 — UNIT F — 2 WATT VHF EXCITER — COMPONENT LAYOUT



UNIT - J

the RF section used as a local oscillator generator for transverters. The circuit diagram and component layout are given in Figures 16 and 17. Table 2.12.1 gives coil data for 146 MHz; Table 2.12.2 lists coil data for 52 MHz.

The audio section consists of a 2N3565/2N4249 microphone pre-amplifier driving a 2N4249 modulator. On board is a pre-set modulation level (or deviation) control and a pre-set linearity control which also acts as a coarse frequency adjustment. Final adjustment to operating frequency is by means of a 3/30 pF trimmer.

The 56K modulator collector load is in parallel with the 3/30 pF trimmer. A variation of the bias on the base of the 2N4249 modulator (caused either by adjustment of P2 or caused by audio from the microphone pre-amplifier) reflects a capacitance change across the 56K resistor. Since this

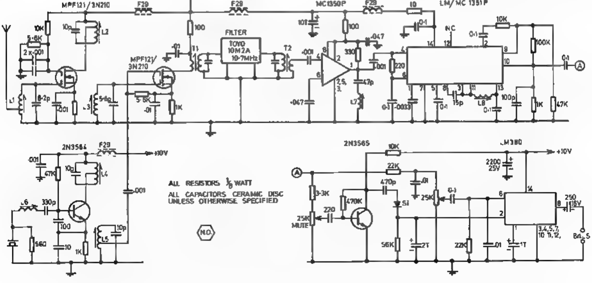


FIGURE 18 — UNIT G — VHF FM RECEIVER — CIRCUIT DIAGRAM

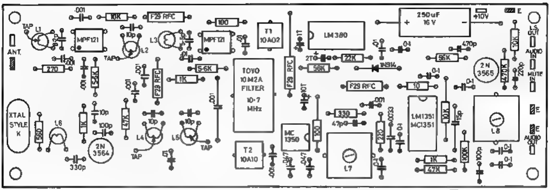


FIGURE 19 — UNIT G — VHF FM RECEIVER — COMPONENT LAYOUT

(varying) capacity is effectively in series with the crystal it induces a change in oscillation frequency. Modulation is pure FM and thus the deviation obtained is a function only of audio drive level. This is in sharp contrast to the more widely used phase modulation system where deviation is a function of both audio drive level and audio frequency.

The crystal oscillator uses a 2N3564 in an oscillator/tripler arrangement, L11 and L12 being resonated at three times the crystal frequency.

The crystal oscillator is followed by two MPF121 doubler stages so that L13 and L14 are resonated at six times crystal frequency and L15 and L16 are resonated at twelve times crystal frequency. Note that the output frequency is always twelve times crystal frequency.

The third MPF121 acts as a straight signal frequency amplifier whose gain is controlled by varying the potential applied to gate 2. A pre-set potentiometer (P3) is provided on the PCB but it may be replaced with an off board control or an off board switched resistive network should this be required.

TABLE 2.11.1

Coil Data — 2 Metre Transmitter

L11	— 18 turns 26 AWG Enam. close wound on Neosid 722/1 Former. Tapped at 7 turns from supply end. F29 Slug.
L12	— 18 turns 26 AWG Enam. close wound on Neosid 722/1 Former F29 Slug.
L13/14	— 9 turns 22 AWG Enam. close wound on Neosid 722/1 Former F29 Slug.
L15/16/17	— 4¾ turns 20 gauge tinned copper wire spread over 3/8" on Neosid 722/1 Former using F29 Slug
L18	— 5¾ turns 20 gauge tinned copper wire spread over 3/8" on Neosid 722/1 Former using F29 Slug.

(a) The chokes marked "F29" are single wires through a Neosid F29 Tuning Slug.

(b) RFC 1 — 12 turns 22 AWG Enam. wire wound 1/8" ID Former (drill shank) and spread to a length of ½"

(c) RFC 2 — is a Philips 6 hole ferrite bead No. 4312/020/31550. Two wires are passed through two of the holes and are effectively in parallel

(d) RFC 3 — 6 turns 20 gauge tinned copper wire on 1/8" drill shank and spread to a length of ½".

The third MPF121 is shunt fed via RFC1 with two capacitors and L7 providing the matching to the base of the 2N5589 transistor. The base choke (RFC2) consists of a Phillips Type 4312/020/31550 6 hole ferrite bead with single wires through two of the holes (for 146 MHz) so that they are effectively in parallel. This arrangement provides a choice of very low Q and other ferrites — such as the Neosid F29 tuning slugs — should not be used since they give a choke with a very high Q. Several cases of transistor failure or faulty operation have been traced to use of improper ferrites for the base choke.

It is also important to note that the crystal (which may be either Style D or Style K) should be specified for parallel operation and should be calibrated with 25 pF IN SERIES with the crystal. Failure to specify this method of calibration invariably leads to an off channel output frequency. Use of HY Q Style K Type PDD crystals is strongly recommended. The method of calibration should be specified on the order. If an FM exciter is required, then the complete unit is built. If only an unmodulated output is required then all components up to Point Y are omitted. The microphone pre-amplifier can be used independently by omitting the 2N4249 FM modulator and its associated components and taking off audio (at high impedance) from Point Z on the circuit diagram.

Setting up is simple. The unit is terminated into a 50 ohm wattmeter and power applied. P1 (the deviation control) is set to zero and P2 set to half scale. P3 (the output level control) is set to give maximum voltage on gate 2 of the MPF 121 amplifier.

A 10 volt meter is placed across the 330 ohm source resistor of the first MPF 121 doubler and the cores of L11 and L12 adjusted for maximum meter deflection. The voltmeter is then transferred to the source resistor of the second MPF 121 doubler and the cores of L13 and L14 adjusted for maximum deflection. With the voltmeter still across the source resistor of the 2nd MPF 121 doubler the cores of L15 and L16 adjusted for a dip in the meter deflection. L18 core is set full in and L17 core adjusted to give discernable output into the wattmeter load. All cores are then adjusted for maximum output starting with L18 and going back to L12. The core of L11 is set midway between the two points of its travel where the final output drops to zero as the crystal goes out of oscillation.

TABLE 2.11.2

Coil Data — Component Modifications for 6 Metres

L11	— 20 turns 28 AWG Enam. close wound on Neosid 722/1 Former Tapped 6 turns from HT End F29 Slug Resonated with 100 pF instead of 10pF.
L12	— As L11 but no tap. Resonated with 100pF.
L13/14	— 15 turns 23 AWG Enam. close wound on Neosid 722/1 Former F29 Slug. Resonated with 33 pF instead of 10 pF
L15	— 10 turns 22 AWG Enam close wound on Neosid 722/1 Former. F29 Slug. Resonated with 10 pF.
L16	— As L15 but resonated with 15 pF.
L17/18	— 8 turns 22 AWG Enam. close wound on Neosid 722/1 Former F29 Slug.

(a) Chokes marked "F29" are single wires through a Neosid F29 Tuning Slug

(b) RFC 1 — 20 turns 26 AWG Enam. close wound directly on to a Neosid F29 Tuning Slug.

(c) RFC 2 — 5 turns 28 AWG through Philips No. 4312/020/31550 "6 hole" ferrite bead.

(d) RFC 3 — 20 turns 23 AWG Enam. close wound 3/16" ID air cored

(e) Other changes —

(i) The two 330 pF capacitors in the oscillator are replaced with 820 pF

(ii) The capacity between the third MPF 121 drain and L17 is increased to 6.8 pF

(iii) The capacity between L17 and ground is is increased to 22 pF

(iv) The capacity between the 2N5589 collector and L18 is increased to 47 pF.

(v) The capacity between L18 and ground is increased to 47 pF

Note that the crystal frequency is still signal frequency divided by twelve and that the crystal must still be calibrated with 25 pF in series.

Section 2 — Unit G — VHF FM RECEIVER

In the preface to this series of articles (AR August 1975) the brief description of the FM receiver implied the use of a double conversion IF block similar to the circuit described in 1971 for what has become known as the "VK3" carphone. In the intervening period a complete redesign has

been undertaken aimed at simplification, size reduction and lower cost. The design now presented achieves these objectives.

Figure 18 gives the circuit employed while Figure 19 gives the placement of the components on the 6 in. x 2 in. circuit board used. Table 2.13.1 gives coil data for 146 MHz while Table 2.13.2 gives coil data for 52 MHz.

A fixed gain MPF 121 or equivalent dual gate protected FET is used as an RF amplifier which is coupled through L2 and L3 to gate 1 of a second MPF 121 (or equal) used as a mixer.

The oscillator section uses a 2N3564 in an oscillator/tripler arrangement. If used at 146 MHz coils L4 and L5 are resonant at the injection frequency, this being 10.7 MHz less than the signal frequency of interest. Output is taken from a tap on L5 via a 1000 pF capacitor to gate 2 of the MPF 121 mixer.

At 146 MHz the crystal frequency is:

$$\frac{\text{Signal frequency} - 10.7 \text{ MHz}}{3}$$

Use of the Hy Q Style K or Style D Type DS is recommended. L6 is slug tuned and affords a simple method of trimming the injection frequency to its correct value.

If used at 52 MHz the crystal frequency is given by the expression:

Signal Frequency — 10.7 MHz

At 52 MHz the oscillator is used direct and does not triple. Accordingly coils L4 and L5 and their associated capacitors are omitted. A wire link is used to bridge the two holes previously occupied by the 10 pF resonating capacitor of L4 and a second link (under the PCB) connects the emitter of the 2N3564 oscillator to the "L5" end of the 1000 pF capacitor feeding gate 2 of the MPF 121 mixer.

Output at the IF of 10.7 MHz is taken from the mixer drain via T1 to the Toyo 10M2A filter. Output from the filter is coupled via T2 to a Motorola MC 1350P minidip amplifier. The filter and its associated transformer are marketed by R.P.G. Agencies of 54 Looker Road, Montmorency, Vic. 3094. The transformer marked 10A02 is used for T1 and that marked 10A10 as T2.

The 1350P amplifier has a gain of around 45 dB at 50 MHz. Such gain in a small space did produce a problem in a developmental model since sufficient 45 MHz energy from the oscillator was picked up by the MC1350 input and after amplification, was sufficient to quiet the MC1351 demodulator. This problem was overcome by use of a series tuned trap (L7/47 pF) at the output of the MC1350. In use the core of L7 is adjusted for maximum noise in the absence of any signal.

Further amplification, limiting and demodulation is done by a National LM 1351 or Motorola MC 1351 14 pin D.I.L. device. Since the 1351 operates direct on 10.7 MHz the need for a conversion stage with its associated crystal and components is avoided. L8 is the coincidence detector coil. No resonating capacitor is needed for L8.

The audio output of the 1351 (Point A on the circuit diagram) splits two ways.

The first branch goes via a 3.3K resistor to a 25K "C" taper pot which acts as a mute threshold control. The small value of the 220 pF capacitor to the base of the 2N3565 noise amplifier discriminates against the lower audio frequencies so that only the "hiss" noise is amplified. The amplified noise is rectified, filtered and applied to Pin 2 of the LM380 audio amplifier. The 2.2 MFD tantalum electrolytic at this point provides a small measure of mute delay. When a quieting signal is received there is no output from the 2N3564 noise amplifier and the 0.12 volts (or more) required to mute the LM380 disappears and the mute is lifted.

The second branch of the audio circuitry goes via the 22K fixed resistor to the 25K "C" taper audio level control. This control is capacitively coupled to an LM380 audio amplifier which provides about 1 watt of output to an 8 ohm speaker.

Note that the 22K resistor and 0.01 MFD capacitor associated with the audio level control are not on the circuit board. The 0.01 MFD capacitor is soldered direct across the two outer lugs of the control while the 22K resistor is used to connect the potentiometer to the appropriate point on the PCB. Similarly the 3.3K resistor is used to connect the audio output point on the PCB to the mute control.

Note that the receiver is designed to operate from a nominal 10 volt supply.

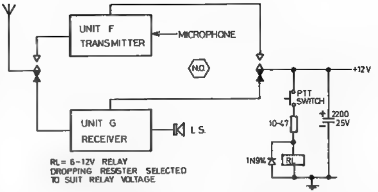


FIGURE 20 - INTERCONNECTING UNITS F & G FOR TRANSCEIVE

TABLE 2.13.1

Coil and Capacitor data for 2 metres.

L1	— 4¾ turns 20 gauge tinned copper wire spread over 3/8" on a Neosid 722/1 former using an F29 slug. Tap is 1½ turns from the earthy end of the coil.
L2	— As L1 but tap 2¼ turns from the HT end of the coil.
L3	— As L1/L2 but no tap.
L4	— 5¾ turns 20 gauge tinned copper wire spread over 3/8" on Neosid 722/1 former using an F29 slug. Tap 2¼ turns from HT end of coil.
L5	— As L4 but tap 2½ turns from earthy end of coil.
L6	— 10 turns 22 AWG enamelled wire close wound on Neosid 722/1 former. F29 slug.
L7	— 10 turns 22 AWG enamelled wire space wound on Neosid 722/1 former to length of 3/8". F29 slug.
L8	— 60 turns 36 AWG enamelled wire close wound on Neosid 722/1 former. F29 slug.

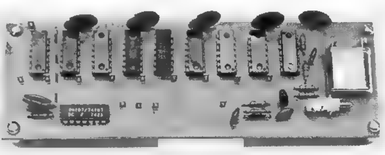
Note that T1 and T2 are supplied with the filter.

TABLE 2.13.2

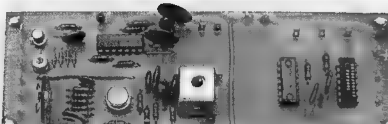
Coil and Capacitor data for 52 MHz

L1	— 12 turns 22 AWG enam. close wound on Neosid 722/1 former F29 slug. Tapped at 3 turns from earthy end. Resonated with 10 pF.
L2	— 12 turns 22 AWG enam. close wound on Neosid 722/1 former. F29 slug. Tap at 5 turns from HT end. Resonated with 10 pF.
L3	— As L2 but no tap.
L4/5	Not required.
L6	12 turns 22 AWG enam. close wound on Neosid 722/1 former. F29 slug.

In the next issue it is intended to describe the digital modules.



UNIT-H



UNIT-I

Wh lst the receiver will, in fact, operate quite satisfactorily over the 8-14 volt range the 10 volt design centre was adopted to allow use of a simple regulator between the normal mobile supply of 13.6 vo ts and the receiver. In a mobile environment such a regulator has been found necessary to prevent direct modulation of the LM380 audio device by ignition spikes appearing on the vehicle supply lines. Alignment is best done using a signal generator having a reliable attenuator.

With no signal input the core of L7 is adjusted for maximum noise — indicating that any oscillator feed through is not quiet ng the 1351 demodulator

A large signal is now applied to the antenna input and the core of L4 adjusted until a signal of some sort is heard

When the signal has been identified the signal generator input is reduced until the signal is barely audible and the cores of T1 and T2 adjusted for maximum signal. The cores of L5 and L4 are peaked followed by L3, L2 and L1 in that order, reducing the signal generator output after each adjustment. The alignment process should then be repeated using the minimum discernible input from the generator.

With an off air signal (of known and reliable frequency and audio quality!) the cores of T1 and T2 are adjusted for best sounding audio. The core of L8 is adjusted to minimise ignition noise.

The front end, or converter, section of the receiver can be used on its own as a VHF converter. To do this replace the primary link coupling of T1 with a 100 microhenry R.F. choke. Output is taken from the mixer drain via a 220 pF (or thereabouts) capacitor. This coupling method provides a broadband output although some gain is sacrificed in so doing Similarly the back end of the receiver can be used as a 10.7 MHz FM IF strip. In this case all components prior to T1 are omitted — including the dropping resistor supplying HT to the link winding of T1. The (originally HT) end of T1 input link is earthed and input applied to the end of the link originally connected to the mixer drain

To be continued

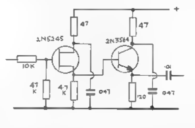
AMATEUR BUILDING BLOCKS

ERRATA

(a) **Figure 2 — Unit A — Page 15 — AR August 1975:**
VFO buffer amplifier should have been as shown on attached diagram.

(b) **Figure 5 — Unit B — Page 18 — AR August 1975:**
First IF amplifier shown as 2N3565 should be 2N3564.

(c) **Figure 6 — Unit B — Page 19 — AR August 1975:**
Resistor in top right hand corner shown as 2.2k; should be 22k.



AVAILABILITY:
Printed circuit boards and/or components for the modules described in the "Amateur Building Blocks" series of articles can be obtained from the WIA, VK3 Components Committee, P.O. Box 65, Mount Waverley, Vic. 3149, or UHF Services, 129 Tennyson St., Elwood, Vic. 3184. Enquiries should be directed to these suppliers. A stamped, self-addressed envelope for a reply would be an appreciated courtesy.

CW Netting The Transceiver

Goffrey Thompson VK3AC
78 Illawarra Road, Hawthorn, 3122

Listening on a number of occasions to the CW net which is attracting many CW ops to the 7 MHz band on Sunday mornings, I have been struck by the number of stations which call the control station well off frequency. In fact recently, of more than 20 callers, only two or three were accurately netted with the control.

It was also puzzling why several stations were calling 1.6 kHz or so higher than the control station frequency and well outside the range of a CW filter excepting for the clicks. However, this was obviously a result of zero-beating the transceiver on its USB listening frequency with the control station. This resulted in a transmission 800 odd Hz higher than the controller's frequency, who, if he was transceiving, would be listening on a frequency 800 Hz or so lower than his transmitting frequency, thus producing a separation of 1 6 kHz.

The problem for the transceiver operator

is that netting must remain guesswork since there is no way in which he can zero beat another station without some external aid such as a separate monitor receiver

This problem has been overcome by a very simple measure taken when using an FTDX401 and also an FT101

To implement the idea however, a second receiver or a frequency counter will be needed temporarily, to set up the method which consists simply of providing a side tone with which the beat note of the incoming signal can be instantly matched.

The FTDX401 and most modern transceivers transmit on three frequencies for each dial setting depending on the position of the mode switch, namely LSB, USB and the CW/Tune position. The AM position also operates on the offset frequency which is approximately 800 Hz higher than the USB listening frequency in Yaesu transceivers.

If you have not done this before, I would suggest that you listen to your rig and note that the USB and LSB carriers are 3 kHz apart, the USB carrier being 3 kHz lower in frequency than the LSB carrier. The CW carrier will be found about 800 Hz higher than the USB carrier, which is on the normal CW listening position. By doing this, you will gain some idea of just what the relationship is between the CW signal and the listening mode.

Obviously, if we can beat the incoming signal to the same audio frequency as the difference between the USB and CW frequencies of our particular rig, our CW transmission will be zero beat with that signal.

Of course, the clarifier could be used to guess this difference, but unless one is blessed with *"perfect pitch"*, it is not possible for the average person to carry the memory of a particular pitch for any length of time without some error when trying to repeat it. If we could, then there would be no problem, but in the absence of *"perfect pitch"*, the simple solution is to use a side tone oscillator which matches the offset frequency. The FTDX401 already has this oscillator

In the 401 I have reduced the pitch of the side tone oscillator from 1000 Hz to 750 Hz until it matches exactly the offset frequency. A couple of dits on the key when tuning to the station to be called enables the two tones to be matched in a second or two and you can be confident when you call you will be well within the CW filter of the other fellow and pretty close to being zero beat with his transmission.

The question of standardising all offset frequencies has been raised, but this does not enter into the matter, since each individual operation will match the incoming signal to whatever the offset frequency happens to be on his particular transceiver. The task of the CWN control operator would certainly become a little less arduous.

The FTDX401 uses a parallel capacity with its own trimmer across the USB crystal to achieve the CW offset and put the carrier into the SSB filter pass-band. These capacities are transistor-switched into circuit by the mode switch when it is switched to the CW, Tune or AM positions. Note that after having set up the matching side tone frequency, any alteration to the USB carrier crystal trimmer will change the offset CW frequency on the 401. Make sure the rig is well warmed up before checking the offset frequency and matching the side tone. Drift is sufficient to reduce accuracy, but the amount will be insignificant compared with the *"guesswork"* method of netting by clarifier and straight listening.

The method has been incorporated in my 401 and all that was required was one fixed capacitor from the junk box.

The same method can be applied to the FT101, but with the 101 I am using I simply changed the fixed pitch of my Autronic keyer monitor oscillator to match the offset frequency of 750 Hz. This meant one more fixed capacitor from the junk box to bring the pitch down from 1034 Hz to 750 Hz. If your keyer has a pitch adjustment on its monitor then there will be no need for any components at all with the exception of a borrowed monitor receiver.

Of course, it is important to ensure that the 101 is initially correctly adjusted so that it transmits and receives SSB on the listening frequencies. These can be different if voltage adjustments are incorrect and this fault would make it difficult to apply the matching tone idea with any accuracy.

While on the subject of CW, it should not be assumed that a commercial rig will be without its keying faults. Clicks, thumps and poor notes can be experienced when using the sideband rig for CW. So if you have another receiver and have never listened to your CW, take a look at the keying characteristics and check for faults.

Transistor switching can often reduce key clicks, but additional keying circuit filtering will be needed in most cases. The FT101 keying was vastly improved with the addition of a 2 mfd capacitor across the key outlet from the rig and a 300 ohm resistor in series with the keying circuit. This eliminated thumps.

The 401 with its tube complement required slightly different treatment since it keys a number of stages together with the PA stage. Clicks and thumps were eliminated by connecting a 2 mfd capacitor in series with a 500 ohm resistor across the key outlet of the rig. The keyer was connected across the capacitor with a 250 ohm resistor in series with the keyer. The result was an excellent shape to the keyed CW and the eliminating of the clicks and thumps. Viewing CW from this rig, John VK3IQ reported that on this CRO, the keying pattern matched exactly the recommended shape published in the ARRL Handbook. This unsolicited comment came before I had mentioned to John that I had been playing around with the keying circuit.

In connection with the idea discussed above for netting the transceiver, a couple of friends in VK2 have adopted the idea with success. One said during a QSO that it would be a bit of a bore to have to build an oscillator to get the tone required, so in fun I suggested that he get a Swanee whistle and tune this to match the G sharp above the seventh octave of C on the pianoforte. He took this seriously, having been through the Conservatorium of Music, made himself a pipe resonant at the difference frequency of his rig and by blowing his whistle and beating the incoming signal against it, zero beats the incoming signal with his own transmitted CW. To beat it all, another VK2 who has been caught with the same problem, twangs his guitar string which he has tuned to the difference frequency, or I should say the offset frequency of his particular rig.

One final word about SSB rigs and CW. The recent interest in QRP has raised the problem of poor tone. On those transceivers which depend, like the 401, on the unbalancing of the balanced modulator, instead of the switching in of another xtal as with the 101, tone can deteriorate with very small amounts of carrier insertion. One possible solution to this is to alter the bias pot on the rig to beyond cut off of the PA stage. This will require more carrier insertion and will very likely improve the note.

Happy netting with the CWN. ■

Magazine Index

With Syd Clark, VK3ASC

QST July 1975
HF Discone Antenna, Receiver Dynamic Range, Crystal-Controlled SSTV Sync System; Monolithic Crystal Filter; Learning to Work with Semiconductors, Pt. 3; RIT for the HW-7

RADIO COMMUNICATION June 1975 & July 1975
The GM30XX Portable 3CM Transceiver; Building Blocks for the Novice, Microwaves, Report of the IARU Region 1 Conference.

Bulletin Reflections. Pat Hawker talks at length about the RSGB over 50 years; Switched Polarization Cubical Quad, A Simple Pre-Scaler for 145 MHz; Building Blocks for the Novice ■

QSP

[illegible]
Recent copies of the local Rockhampton daily contain news of three persons appearing in the Magistrates' Court on charges under the Wireless Telegraphy Act. One of the persons was committed to the District Court for sentence and the other two were convicted, one being fined $50 or three weeks in jail on each of the two charges of possessing radio transceivers for the purpose of transmitting and receiving messages without being authorised under the Act, and the other was released on probation for two years on two charges of maintaining a station for transmitting and receiving radio messages without being authorised under the Act. The newspaper reports also contained a statement by one of the accused that "he didn't have the time to do exams or try". This person was stated to have used the call signs KT153 and 9QJL.

ANOTHER ANGLE
QST July 1975, gives a quote of the month "Amateur Radio doesn't measure its success by volume of traffic, gross revenue, or audience, but simply by how well it has served humanity", and goes on to ask what part have you played in the success of Amateur Radio

LICENCE FEES
"The DOC in Canada has increased the annual licence fee for Canadian amateurs from ten dollars to thirteen dollars per year". QST July 1975. ■

VICOM

Peter Williams VK3IZ
Manager

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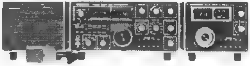

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	AL48DXN	53	3 5 & 7MHz	1 2 1	33 00
	AL24DXN	52	7& 14MHz	1 2 1	26.00
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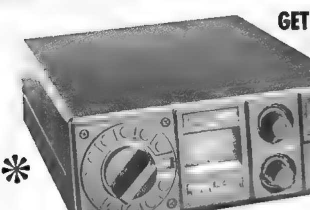

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◆ ◆ ◆

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Peter Williams VK3IZ

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A SIMPLIFIED METHOD OF MORSE CODE MESSAGE GENERATION

L. H. Vale VK5NO
5 Carlton Road, Gawler, S.A. 5118

This article describes a method of reducing somewhat the complexity of morse-code message generators, particularly in the area of the diode matrix, and describes a tail-ender now in use employing the system.

The normal scheme of message generation is to generate a train of equally spaced intervals with an oscillator (the bit generator), and to provide digital circuitry to form an output signal only during the equally spaced intervals necessary to form the desired message. In Fig 1, this has been illustrated for formation of the letter V and a subsequent letter space. A digital counter is made to count the equally spaced intervals (bits) and during bits 1, 3, 5, 7, 8 and 9, diodes are so connected as to key the transmitter.

We can assume that the number of diodes is a measure of the complexity of the coding circuit; in any case the effort required to redesign the coding to fit a new message, and to put the changes into effect, or to design a switching circuit to enable alternate messages, is directly proportional to the number of diodes or other coding elements used, that is the number of ~its during which action needs to be taken.

It can be seen from Fig 1 that, in the case of the letter V and its subsequent space, that the proportion of bits during which action is taken to the total number of bits is 50%. This ratio is approximately true for all morse code messages. The coding method described significantly reduces this percentage; it is possible only because of the unique timing relations existing in the standard telegraphic code (herein loosely termed "Morse" code).

If we compare a string of dots with the letter V plus space, as in Fig 2, one can see that they differ only during bits 8 and 11. Therefore, if we start our process by producing a string of dots, we need only take action to invert it during these two bits; this immediately reduces the number of diodes required to one third of that normally required. Fortunately, the string of dots is already available in the usual message generator at the output of the first counter stage, and the inversion can be accomplished by an exclusive-OR gate, or some similar circuit which acts as an inverter when the second input is at (1) but is non-inverting when the second input is (O), or vice-versa.

The reduction by two thirds of the bits during which action needs to be taken is generally the case with this system but varies, of course, with the particular message required.

Action is required to be taken during the centre bit of a dash, the centre bit of a letter space, and twice during a word space, so if the total of dashes, characters and word spaces in a message are added, the result is one more than the number of diodes (or other devices used in coding) required.

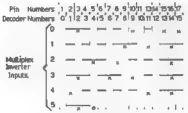


FIG 4 Coding of "DE VK2AHM".

An example of the use of the above simplification method is a tail-ender recently made to send the message DE VK2AHM. A push-button initiates the sequence and a pair of relay contacts close during the sequence to switch the transmitter on.

In the message there are 10 dashes, 8 characters and one word space, so the number of bits in which action is required is 18. A 1 of 16 decoder and an 8 bit multiplexer are used. The total number of diodes required in the matrix is 18, and modifying the sequence is simple. The total number of bits available for the sequence is 128 which is more than enough for any amateur call. There are 84 bits in the required message, counting a first starting (switching on) bit.

Fig 3 is a circuit diagram of the tail-ender. U1B and U1C form a latch which, when triggered by pushing the start button, applies positive voltage to initiate the unijunction clock oscillator Q1 and, via U1D and Q2, to pull in relay RL, which switches the transmitter on.

The clock pulses from Q1 drive dual flip-flops U6 and U7, and the Q outputs of these flip-flops code the inputs to the decoder U4. A string of clock pulses from Q1 therefore has the effect that the outputs of the decoder each go low in sequence from 0 to 15 (pins 1 to 11, 13 to 17) during the periods between clock pulses, and repeat this sequence as long as there are clock pulses. The output (QD) from U7 also clocks another dual flip-flop U8 which clocks single flip-flop U9 to provide three more Q outputs, QE, QF and QG to code the control inputs of an 8 input multiplexer U5, which switches each of the inputs in turn to the output Y. Therefore, at any time in the sequence, only one output of U4 is low, and only one path is complete through U5. DTL inverters in U2 connect to each of the six U5 inputs so that the addition of a diode between an input of U2 and an output of U4 will cause the corresponding output of U2 (and input of U5) to go high during the period when that output of U4 is low.

Before starting, when the flip-flops are set at zero, the O output of U4 (pin 1) is low and the O input of U5 (pin 4) is connected to Y as there is no diode in position O to O in the diode matrix, therefore the O input of U5 and Y will both be low

To clarify the description of the sequence, we should look first at the diode matrix for DE VK2AHM (Fig 4) and the method of deciding where to connect the diodes.

The first step is to lay the required message out in sequence on graph paper which has the same number of squares in a horizontal row as there are outputs in the decoder (in this case 16), and number the columns in decoder output numbers and pin numbers (in this case for the 74154). The required message is then laid out with correct spacing on the squares, using exactly 16 bits per row, as shown, starting at the start of decoder output 1.

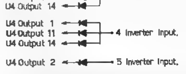


FIG.5. DIODE CONNECTIONS FOR DE VK2AHM

FIG...

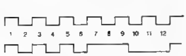


FIG 2

Then mark with a cross the bits during which an inversion is required — that is, the centre dots added to form dashes, and the dots removed to form spaces.

Firstly, it can be seen from the graph layout that in this case there is a total requirement of 84 bits, which is well below the total of 128 bits available with a 16 output decoder and 8 input multiplexer. The 85th bit turns the tail-ender off.

Secondly, it will also be seen that diodes are required at the following positions on the first row: (2-0), (9-0), (13-0) and (15-0). These diodes are therefore connected with cathodes going separately to the required U4 outputs and anodes going in common to the input of the inverter whose output is connected to the O input of U5. Repeating this performance on the other rows we finish up with the diode matrix as shown in Fig 5.

Following the logic through, it will be seen that when there is no diode present in the matrix, that is during all bits in the first row, except bits 2, 9, 13 and 15, the base of Q3 is taken negatively by U3B (W is an output of U5 complementary to output Y) whenever QA goes high. This produces the required string of dots. During a bit such as 2, when a diode is present,

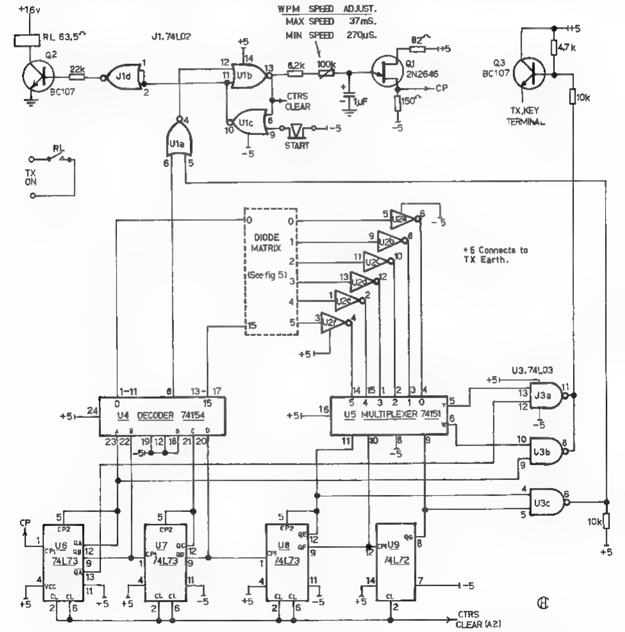


FIG.3. TAILENDER CIRCUIT DIAGRAM.

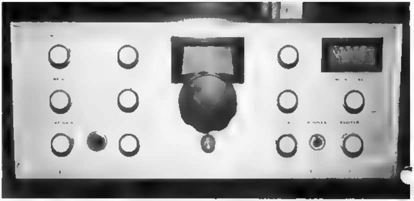
U3A is enabled instead of U3B, inverting the process, so that the availability of complementary outputs from both U5 and U6 enable U3A and U3B to perform the inverting function instead of an exclusive-OR gate

The end-of-message function is performed as follows: U3C output goes low when both QE and QG outputs of U8 and U9 respectively are high (on row 5), when this condition coincides with a low on output 4 of U4, the output of U1A goes high, unlatching U1B and U1C, which stops the sequence, and drops out the relay, taking power off the transmitter, and resetting all the flip-flops to zero. By choosing the correct combination of U8 and U9 outputs to determine the row of the "stop" bit and the U4 output to determine the position in the row the sequence can be stopped as required

This tail-ender is built on perforated board and enclosed in a die-cast box. The unit keys an FI DX400 transmitter and has been in operation since late 1973. ■

Improving The 'EICO 753' on 14 MHz

Alan Shawsmith VK4SS
35 Whynot Street, West End, Brisbane, 4101



The EICO 753 Tri-band transceiver might be described as a popular, low cost, utility type set. The writer has owned two such units and found their performance quite satisfactory, except that the gain, sensitivity, and S/N ratio on 20 metres is below that on 80 and 40 metres. The manual gives the sensitivity as 1 uV for 10 dB S/N, however better than .5 uV on 80 and 40 metres is claimed by a USA magazine which put the set on test.

If DX is your main interest, an improvement on weak 20 metre signals can be obtained by the following very simple and almost instant modifications. In brief, proceed as follows—

Remove ground wire between RF valve 6BA6 V16, pin 2 and ground. Remove resistor R61 from pin 1 of V16 and connect it to pin 2 of V16. Wire a .02 disc ceramic by-pass condenser from pin 2 of V16 to ground. Wire a 1 meg. resistor between pin 1 of V16 and ground.

On the tag strip associated with the wiring for the VFO tube 6EH7 V11 (or solid state modified VFO) remove the 27K resistor R56 and replace it with a small 1 mH RF choke. Remove the 47K resistor R53 and replace it with a 4.7K resistor.

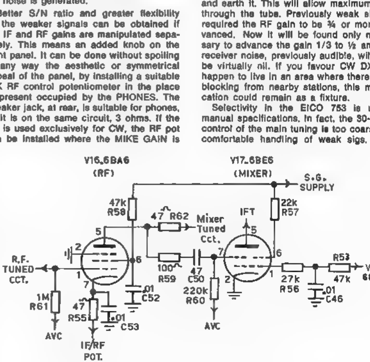
These changes should result in maximum RF gain on weak signals and better first conversion efficiency. Tagging the AVC line on to the suppressor grid, pin 2 of RF tube 6BA6, does not result in any increased pumping or blocking as might be supposed.

It is common practice to tie both the IF and RF gain to one variable control and designate it on the front panel as RF gain. This makes for easier operation by virtue of only one knob. However, in the case of the EICO on 14 MHz, there is a point reached when this control is advanced towards maximum, where the internal noise and signal, increase at the same rate. This is because of excessive and unnecessary gain through the IF strip where much of the noise is generated.

Better S/N ratio and greater flexibility on the weaker signals can be obtained if the IF and RF gains are manipulated separately. This means an added knob on the front panel. It can be done without spoiling in any way the aesthetic or symmetrical appeal of the panel, by installing a suitable 10K RF control potentiometer in the place at present occupied by the PHONES. The speaker jack, at rear, is suitable for phones, as it is on the same circuit, 3 ohms. If the set is used exclusively for CW, the RF pot can be installed where the MIKE GAIN is now placed. (Do not cut the leads to the MIKE GAIN: simple let the pot rest loose in the set — you may want to restore it).

However, as a temporary measure, the effect of this modification can be gauged without changing anything at all. Simply disconnect, at the RF GAIN pot, the cathode lead from the RF tube 6BA6, V16, and earth it. This will allow maximum gain through the tube. Previously weak signals required the RF gain to be ¾ or more advanced. Now it will be found only necessary to advance the gain 1/3 to ½ and the receiver noise, previously audible, will now be virtually nil. If you favour CW DX and happen to live in an area where there is no blocking from nearby stations, this modification could remain as a fixture.

Selectivity in the EICO 753 is up to manual specifications. In fact, the 30-1 fine control of the main tuning is too coarse for comfortable handling of weak sigs. Fine



RELEVANT PART OF THE ORIGINAL CIRCUIT OF EICO 753.

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trim is usually done with the RX-OFFSET. But again, this control is too coarse and would be improved by the introduction of a small 3-1 or 5-1 vernier. This is something the owners of the set can ponder on.

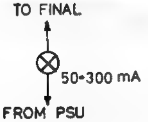
The transceiver's IF strip is at 5.2 MHz. In common with some makes, it is prone to outside QRM, at this frequency. There will be times when a strong modulated signal breaks through and renders the set virtually useless. It matters not if the antenna is selective with co-ax feed, or a random wire with an ATU. Fortunately, it is easily cured. In an earlier issue of "AR", a suitable trap for this type of QRM was described. It is effective and can be constructed and tuned, in a matter of minutes. The simplest way is to use wire of sufficient gauge to be self-supporting. Wind 12 turns at about ¾ in. diameter and spaced about 1½ in. long. Solder the ends to a heavy duty .001 uF condenser and insert in the co-ax line, at the set. Now, with a screwdriver short out a turn, or two, or fraction thereof, until the offending signal is at a minimum. Enclose trap, at leisure, in small metal box and re-trim coil.

A final comment, on the transmitting section — the PA. If there is a tendency to instability, reset the neutralizing condenser as per manual instructions. If the trouble still persists, connect to the junction of R110 and the long wire leading from it, a .01 disc ceramic to ground. The output of the PA on 14 MHz is likely to be about 10% below that of the other two bands. this seems to be mainly in the set design However, increasing the coupling condenser C97 between driver tube V15 and PA V13 by as much as 3 to 5 times in capacity should result in an increase in output of about 5%. Do not forget to re-align tuned circuits L10, L11, L12.

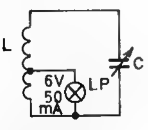
A short perusal of the circuit manual will show that these modifications for improving the EICO 753 are simple and virtually self-explanatory. The S/N improvement is quite noticeable and brings the performance on 14 MHz closer to that pertaining on the other two bands It is also an easy matter to restore the changes to "as-was", in a matter of minutes. ■

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP



CURRENT INDICATOR AND FUSE



INDICATING WAVEMETER

LAMPS AS INDICATORS

In addition to its role as a power on indicator, or dial illuminator, the humble light bulb can be of great use as a cheap indicator of current, voltage or power.

Light bulbs can be powered by DC, AC or RF and provide highly visible indications.

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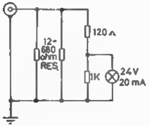
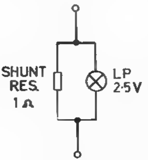
In the aerial circuit, a combination of light globe and resistors can provide a means of indicating antenna currents.

Other uses are in wavemeters and as a power indicator for a dummy load.

Gil Sones VK3AUI



DUMMY LOAD POWER INDICATOR



RF CURRENT INDICATOR

QSP

BEWARE OF NICAD MEMORY

Just a reminder if you have N Cad batteries in your walkie talkie or other portable appliances They have a "memory" such that if you run them down just a little bit then recharge, they start believing that is all they should put out and will go dead long before you expect them to The solution — periodically discharge them then give them a full charge. From 'Collector & Emitter' June 1975

USA 70 CM BAND

Ham Radio, June 1975 contains references to more threats to the 420-450 MHz band from 20 KW ERENS (Extended Range Electromagnetic Navigational System) transmitters with a range of 250 miles in Dallas on 430 MHz and new ones projected on Cape Cod and Montauk Point L.I. The comment is, "If permitted, these pulsed navigational systems would make a large portion of the 420-450 MHz band practically unusable"

QSL MANAGER FOR VK CONTACTS

A note from VK5BS QTHR, advises he handles QSL cards for VKs contacting ZK1CV ZK1BS and VK5BS/YJB.

CONTEST LOGS

Sound comment seen in the write-up of the 1974 CQ WW DX contest results column in CQ for June 1975 — "Stop breaking my heart. Stop re-copying your logs. Every year I see log after log with 500 to 3000 contacts recopied by hand. It ain't necessary Honest Use carbon paper or make a photocopy Rewrite any illegible calls in the margin 'Contests' are supposed to be fun and re-copying logs ain't fun Besides, recopying logs can introduce errors no matter how careful you are'

WARC 1979

CQ June 1975 quotes introductory remarks by A Prose Walker (chief of FCC amateur and CB Division). Chairman of the Amateur Service Working Group's Conference on May 8, at FCC HQ in Washington as follows "This could be a golden opportunity for Amateur Radio. We're in a position, hopefully, to shape Amateur Radio for the remainder of the century and well beyond. Our goal is to do everything possible to strengthen Amateur Radio's position at the 1979 Conference. Our task won't be an easy one and no one can guarantee that we will succeed. That's why we are here today to get things started in the right direction, and to give it our best." ■

NEWCOMERS NOTEBOOK

with

Rodney Champness VK3UG and David Down VK5HP

A NOVICE TRANSMITTER — Part 2

Receivers of many types are available fairly readily to do the job of receiving a Novice will require. It doesn't matter that it will tune the broadcast band as well as the International Broadcasting Short Wave transmissions, as long as it does cover the Novice sections of the bands that you are interested in.

However, the transmitter is a totally different proposition. It must be Crystal Controlled or have a Frequency Synthesiser (expensive) or a variable Crystal Oscillator, and the bands that you are interested in are only 3.5, 21 and 27 MHz so the transmitter does not need to cover other bands. Most commercially available transmitters cover several more, and also are much higher in power than the 10 watts Output allowed on constant carrier modes, or the 30 watts Peak Envelope Output Power allowed in the Side Band modes. It is with these things in mind that the transceiver to be described came into being. It does transmit AM/CW with an output of 7 watts and 10 watts respectively. It only transmits on 3.5 MHz. The receiver is for the same band and can receive AM/CW/SSB and with careful tuning FM, and follows at the end of the transmitter articles.

This month the Radio Frequency side of the transmitter is described. It would be possible to get on the air with just this section if you wish to work on CW exclusively. The valve used in this transmitter is a television vertical oscillator triode and pentode power output; it performs equally well in the role of crystal oscillator and PA output. Throwouts from TV sets sometimes work quite satisfactorily in this transmitter long after their useful life in a TV is over. An approximate chassis layout will be given in a later article as well as information on how each section works together

The 6GV8 triode is connected as a Pierce oscillator with no tuning Feedback to maintain this oscillator working is obtained from C1 and the distributed capacity between the plate of the valve and other circuit components to earth (cathode). The plate load of this valve consists of RFC1 and R4 as well as R5, R6 and the diode load formed by the grid-cathode circuit of the pentode output section. The oscillator will provide about 1.5 mA of grid drive to the output stage.

The drive to the grid of the power amplifier causes the grid to conduct on each half cycle. The voltage at pin 9 is calculated by multiplying grid current in milliamps (I) x the resistance in the grid circuit in kilohms (R) and this will equal the bias at the grid (E) in volts. I x R = E I = 1.5 mA, R = 28K ohms, therefore 1.5 x 28 = 42 volts, and this is the negative bias on the grid of the power amplifier. The valve is being run in Class C2 and is normally biased well beyond cutoff. The cutoff point for the pentode section of a 6GV8 is less than —42 volts that the grid has on it normally. The output of the triode oscillator, however, causes great variations in the instantaneous grid voltage and at times it is driven into grid current — in other words the grid goes positive relative to the cathode. It must go positive otherwise no grid bias will be developed.

The power amplifier stage has protective cathode bias with the resistor R8 between the cathode and earth. Should the drive from the oscillator disappear for any reason the output stage and the oscillator stage will be protected for a short period by their respective cathode bias resistors. I don't recommend that you operate the transmitter without drive for a period of more than about a minute as the power amplifier stage will have its plate dissipation rating exceeded. On AM this works out to 10 watts, I (.040) x E (250) = 10 watts. The plate dissipation of a 6GV8 pentode is 7 watts. When the transmitter is putting out RF energy into the aerial, 7 watts of the energy flowing through the plate circuit of the 6GV8 is fed to the aerial and only 3 watts heat up the valve, so it is safe from damage.

The resistors and capacitors in the cathode circuit of the two valve sections need special comment as they do several jobs. R3 and R8 provide cathode bias for both sections. To key this transmitter in the CW mode the key is placed across the terminals marked tip and sleeve of socket J1. Consider that the key is at rest. The voltage at pin 3 and pin 8 will be determined by the voltage divider formed by R7 and R9 and gives a voltage of about 100 volts plus at these points effectively cutting off both valve sections. The key is now depressed and the bottom ends of both R3 and R8 are earthed. The voltage at pin 3 decreases to normal operating voltages for the oscillator from the 100 volt hold off bias in about 10 microseconds. The oscillator therefore starts to work quickly. However the time constant for the components in the cathode circuit of the power amplifier is very much longer. For the purpose of this exercise we will assume that the formula T (time in seconds for discharge or charge of RC circuit from 10 percent to 90 percent charge and viceversa) = 2.2 x C (Capacity in Farads) x R (resistance in ohms) is the correct one. For proper shaping of the CW keyed waveform, it is necessary to switch the transmitter on and off slowly. Slowly is a relative term and for CW wave shaping this is of the order of 5 to 20 milliseconds. Now to calculate our particular circuits time constant — T = 2.2 x C (10uF — 10/1,000,000 farads) x R (220 ohm). T = 5 milliseconds. This means that the transmitter will not be up to full power for approximately 5 milliseconds after switch on. When the key is lifted the reverse action occurs except that the charging current for the cathode capacitors comes via the plate circuits of both valve sections and the cut-off procedure is much slower and could easily equal 20 milliseconds. Therefore the attack characteristics of the network are faster than the decay characteristics, and regrettably with this simply CW key shaping circuit these slight limitations must be accepted. The oscillator is fed in parallel when the key is lifted so the oscillator remains in operation until about the time the output section ceases to operate. On AM, C4 also acts as the audio bypass for the modulator audio, so therefore does two jobs. C5 and C2 are only for RF bypassing. R8 is the power amplifier cathode biasing resistor as well as the timing resistor for the CW wave shaping circuit. R7 and R9 are purely to act as a voltage divider so that the cathode bias on the two valve sections is approximately 100 volts, so cutting off the two sections with key up in the CW mode.

The screen circuit of the output section has the normal bypassed screen voltage dropping resistor. The value of R10 depends to a certain extent on the total supply voltage to the valve, and will be lower in value if the power supply voltage is lower than indicated in this particular instance, and conversely it will be higher in value if the supply voltage is higher than specified in this article. If you want a little more output with the voltage specified on the supply lowering this resistor will increase the output so that it exceeds the Novice level, and maybe, if you don't take care, the valve could quit on the job.

The plate circuit is the usual pi-coupler output system which is quite popular in modern HF transmitters. R11 and RFC2 form a parasitic oscillation suppression circuit, designed primarily to suppress VHF parasitics. R2 in the grid of the triode oscillator performs the same function quite effectively. The HT voltage is shunt fed via an RF choke RFC3 via metering resistances R12, R13, and M1, RFC2 and R11. C7 is an RF bypass capacitor of value such that it bypasses the RF but has little effect on the audio from the modulator. C6 in the screen circuit serves the same purpose. RFC3 blocks most of the RF in the plate circuit from being wasted in the HT supply circuit of the transmitter or from causing all sorts of miscellaneous transmitter ills. C8 passes the RF energy to the pi-coupled output tuned circuit. Note that from the plate pin of the output stage to the junction of RFC3 and C8, RF and DC are coursing down the one lead together. The choke and capacitor separate these two components and this in reality is a basic filter network. The RF having passed through C8 encounters the tuned circuit. The values of C9, C10, C11 and L1 are optimised so that not only will the circuit tune to 3.5 MHz, but will present the correct load impedance to the output valve section and to the 50 or 75 ohm aerial system. The correct ratios of the component values ensures that the transmitter tunes correctly, loads correctly and has minimum spurious output. The spurious out-

put is —39 dB relative to the carrier level, this is better than some very well known and respected amateur transceivers, in fact it would not be hard to better this figure with slight additional complexity.

An interesting observation was made during the period whilst various LC ratios were being tried in the output of the transmitter. At one stage about 50 per cent more inductance than currently used was in circuit. This caused the output of the transmitter to peak off to one side of the dip in plate current. An old crystal for a frequency of about 2/3rds the frequency was inserted, and it was found that the peak output occured when the plate current dipped at resonance, as observed on the watt meter and the plate meter. This seemed strange so the formulae used to calculate the inductance/capacity values were rechecked and it was found that one factor had been overlooked in the calculations. When this factor was incorporated, it was found that the inductance to use was less than before. A new coil was wound and wired in. Now the transmitter output range tuned such that maximum output occured at plate current dip, when on 3.5 MHz and did not tune properly on the frequency where it was previously tested. There is possibly a small point to be considered here although an important one — the transmitter will tune correctly if the tuned circuits match the output stage and the load impedances at the frequency of operation. If your transmitter does not appear to give maximum output near or on the bottom of the valley of the plate current dip it could mean the circuit LC ratio is wrong. Other problems could be that the stage needs neutralising or that it is on the verge or occasionally going into parasitic oscillation.

RFC4 is not really needed, in fact you can remove it and no trouble should occur ever — but, it is possible to kill yourself if you do leave it out. The purpose of RFC4 is to act as a DC return should C8 breakdown and place HT on the aerial line. In most cases no harm will come to anything if the majority of aerials are insulated from earth. Woe betide anyone who touches such an aerial if this capacitor fails as it could be the last thing they do. 300 volts DC with a larger filter capacitor behind it could be fatal. RFC4 acts as a short circuit for the HT voltage and static build up too, so that the power supply fuse blows to alert the operator that something is wrong

There are two manually operated switches on the transmitter, and these switches function so that the transmitter is set up for AM or for CW, S1, and to actuate the netting function, S2. Switch S1 is shown in the CW position 2. In this position S1a switches the plate circuit HT supply via 19 and the HT relay contacts. In position 1, it switches the HT line to the modulated HT line via the modulator. S1b is open circuit on the CW position and switches HT voltage to the modulator and PA valve when in the AM position. S1c is open circuit on CW but grounds the cathode resistors of the RF valve sections when in the AM position. The morse key goes across the switch contacts in the circuit. S1d is open circuit on the CW position, but the back contacts of the morse key keep this line shorted to earth whenever the key is not being used. If this complete line has both short circuits removed from earth the semi-break-in keying system will start to work, but that is further on in the article. In the AM position, this line is earthed and the semi-break-in circuit cannot work.

S2 is shown in the normal position. S2a is shown with no short on the cathode lines of the two valve sections so that the AM/CW switch can operate independently S2b is switched so that the oscillator receives its voltage via the same path as the output stage when on CW. When the switch is thrown to the netting position, the cathode circuits of both valves are completed to earth and the oscillator receives HT via R18 so activating the oscillator without the output stage operating. The value of R18 is adjusted such that the oscillator puts a good strength signal into the receiver when you are netting to your transmitter, without being so strong as to swamp the receiver or be so weak that it is almost impossible to hear below static crashes, signals, etc.

The circuitry which comprises the two transistors TR1 and TR2 is the circuitry used for the Press To Talk (PTT) function on voice and for the Semi-Break-in function on CW. This is a very simple circuit which works quite effectively. It does just the same job as one seen in an American article with a fraction of the parts count. This particular transmitter/receiver function changeover system was described in The *Radio Bulletin* the journal of the *Eastern and Mountains District Radio Club* for December 1974. The author always abhorred the drudgery of manual changeover from transmit to receive and vice-versa on CW, and this particular little circuit is the result. It has features which are quite important if the first character of any string of characters is not to be clipped — as several transmitters do.

You will note by checking the circuit that the morse key is wired so that the back contact is used in addition to the normal keying contact. As you commence to operate the morse key the earth on the back contact is broken several milliseconds before the keying contact is earthed. During this time, current flows through R14, D1 and R17 to turn TR1 on, as the earth on R14 is removed. The current into the base of TR1 turns it on hard which causes the base of TR2 to be drawn towards the collector voltage which is at earth potential. This causes TR2 to also turn on hard and in so doing it pulls in the relay in its emitter circuit, which changes over the equipment from receive to transmit. This changeover occurs in the time it takes for the key to unearth the back contact to the time the keying contact is made. This is only a few milliseconds, and these few milliseconds are sufficient time for the relay to operate and change the equipment over from receive to transmit. However, when the key is released the relay would immediately drop out so causing quite a bit of mechanical noise in the set. The components R16 and C12 function to keep the transmitter in the ready to transmit condition for a period that is governed by the value of C12. C12 is normally in the range 1 to 2.2 uF and these values will give a hold time for the semi-break-in system of ½ to 1 second before the relay releases. With a 12 volt DC supply R16 must be of such a value that about a volt or two is dropped across it if C12 were shorted out with the key depressed. R16 is in series with C12 so that as soon as the earth is removed from R14, etc., enough voltage is developed across R16 and fed to the base of TR1 to cause it to saturate, despite the momentary apparent short circuit across C12 as it charges. The inclusion of R16 means that it is not necessary to worry about the delay that would have been caused to the operation of TR1 because of the charging time constant of R14, D1 and C12. This worked out to be a delay of at least 3 milliseconds. This amount of delay combined with the response time of the relay could mean that the first character sent may well be clipped. A 3 cent resistor prevents this.

When the key is released the short is re-applied to R14. D1 isolates C12, R16 and R17 so the charge on C12 supplies base current to TR1 for about ½ to 1 second keeping it saturated, in turn TR2 as well and the relay operated. After a period, the voltage on C12 drops to a level that will not keep base current flowing in TR1 and it ceases to conduct, likewise TR2 has no base current supplied, ceases to conduct and the relay releases and the equipment is back on receive — until the key is again pressed.

D2 functions only as a transient suppressor so that TR2 is not damaged. D3, C14, R20 and C15 form a rectifier filter system from the 12 volt AC filament line. Nominally the output from this half wave rectifying system is 12 volts DC but with no load this does creep up to about 16 volts. The regulation on this line is not particularly important as long as the DC is reasonably well filtered.

At this stage I will not be giving you a layout for the transmitter, but recommend that you read Newcomers Notebook for March and April 1974, which goes into design and layout of equipment. A layout suitable for the complete transceiver will be published in a later issue, complete with photograph.

STR1 is a 8 or 9 tag terminal strip, and the points labelled are as follows — A = chassis earth, B = Press to talk (microphone line), C — 12.6 volt AC heater line, D — High tension line to the modulator, E — Modulated high tension line from the modulator to the PA stage, F — 6.3 volt AC heater line, G — Receiver HT earthing line, used to prevent accoustic feedback when changing over from transmit to receive and vice-versa. It may not be necessary, H = Audio monitor line from the modulator output transformer

STR2 is a 6 to7 terminal strip (or a multipin socket, if the receiver is mounted on

a separate chassis to the transmitter). The points are labelled as follows — 1. Receiver HT if taken from the transmitter supply. 2. 12.6 volts AC for heaters if taken from transmitter supply. 3. Receiver aerial terminal. 4. Chassis and shield earth. 5. See G of STR1. 6. See H of STR1.

The plug P1 is connected to the power supply, pin 3 supplies 6.3 volts AC for heaters, pin 4 supplies 12.6 volts AC for heaters and relay supplies, pin 6 supplies HT at approximately 300 volts DC positive and pin 7 is the common earth return for the various supply voltages.

Hopefully you will not have much trouble in understanding the whys and wherefores of this transmitter. The tuning of the transmitter in use is simplicity itself. Plug a crystal in for 80 metres, set C9 and C10 to maximum capacity and with a dummy load/indicating wattmeter or aerial attached, turn the transmitter HT on. A reading between 40 and 60 mA will be indicated on the plate current meter. Rotate C9 towards minimum capacity and the plate current should reduce and then rise again as you go through resonance of the final tuned circuit. C9 should be adjusted so that the plate current reads in the middle of this dip. Your wattmeter should show a reading of a few watts on its meter. If the meter dips below 40 mA on AM or 50 mA on CW rotate C10 about 30 degrees and redip the plate current with C9. Alternately adjusting C9 and C10 should give you the plate currents specified or if you are using your wattmeter, adjust the transmitter tuning for maximum output, which should be about 7 watts on AM and 10 watts on CW. However, on some aerials particularly if reactive, the tuning may be odd to say the least and in these circumstances an aerial tuning unit may be required.

Should you get no dip in the plate current, check that the oscillator is in fact working by measuring the voltage across R6 — this should be about 1.5 volts with positive to earth. If this is not so check your valve, circuit wiring; and the crystal too, if you have another. Check the voltages around the stage too. If you still have troubles and can find no drive voltage, it is suggested that you approach an amateur with more experience than yourself for a helping hand. If the drive is okay check that the plates of C9 and C10 are not shorting. If they are — like one of the ones used in the prototype — you will have to use a little gentle persuasion by gently bending the moveable plates so that they do not short throughout their rotation.

The meter M1 is a 2 inch square meter marked "Advance" and is calibrated 0-60. This was most convenient as a maximum plate current of 60 mA in the off tune condition was expected. R13 and M1 form a 0-6 voltmeter across R12. It is necessary to vary the value of R13 until a total current drain of 60 mA flows through the network R12, R13 and M1. To calibrate this meter accurately it is suggested that a multimeter be wired in temporarily in series with this combination and set to an appropriate meter range. It is then easy to adjust R13 for a reading on M1 which corresponds to the multimeter current reading.

The semi-break-in section of the transmitter should give no trouble, and any problems are likely to be wiring errors such as connecting the transistors incorrectly into circuit, or incorrect wiring of the mode switch that the short is not removed in the CW position.

This part of the article is already lengthy so it is not possible to give a chassis layout this month. It will, however, follow shortly. It is suggested that a chassis of at least 8 inches x 5 inches x 2 inches be used to construct the transmitter on, and preferably a bit larger to allow plenty of room for some layout mistakes.

Next month the modulator. ■

Commercial Kinks

with Ron Fisher VK3OM

3 Fairview Ave., Glen Waverley 3150

This month we shall continue our look at the FT101 and in particular the 'B' model. Talk to a 101 owner and more often than not, the subject of overload by strong local signals will come up. The interesting thing is that often the 101 owner doesn't know what front end overload is. I well remember when I did the review of the 101B that appeared in February 1974 Amateur Radio, that front end overload was something I was looking for but did not find. Why are some 101Bs not subject to this trouble? Well at this point of time I don't know the answer. Have you any thoughts? However for those who do have trouble in this regard here is a simple cure. As I have not tried this out myself, there is no guarantee of instant success. The originator of the idea is Jack Taylor VK3NS.

Simply locate the 100K ohm resistor feeding the second gate of the 3SK40M RF stage (R5) and remove it from the board. Now replace it with a 5.6 volt zener diode. A small ¼ watt type is quite OK. That's all you need do. According to those who have tried this, stations as close as a few hundred metres are now clean copy without the need to use the RF attenuator. Another method that seems to have originated from several sources is to use a uA 741 IC to amplify the AGC voltage to the RF stage. This method was described by Arn, VK5XV, in the South Australian Wireless Institute Journal of April 1975. It has also been published in the Fox Tango Newsletter and is also the subject of a future article for this magazine.

While on the subject of AGC and the 101B, I find the action a bit on the fast side. Some additional capacity across the AGC line improves matters and I have found that ten uF with a two thousand ohm resistor in series, connected from either pin 13 of the IF board, or pin 9 of the RF board to ground is ideal. However as AGC decay time is very much a matter of opinion, you should try different amounts of capacity. With smaller amounts of capacity the series resistor should be reduced in proportion.

The FT101B VOX adjustment has been covered in this column in the past, but VOX operation still remains a problem. As the setting of the controls is very critical, it follows that many amateurs just will not bother to use VOX at all. This is a pity as the intelligent use of VOX is one of the real benefits of the sideband mode.

However, things can be improved to a very large extent by a simple change. If the source of transistor Q5 (an MK-10D FET on the audio board PB-1315), is connected direct to ground instead of through the resistor thermistor network, the adjustment of VR3 will become much less critical. Satisfactory operation should occur with VR3 set to about half resistance. Many operators find that the VOX delay is a bit short so while you have the audio board out, replace C23 a .1uF with a .33uF of the same physical type and there will be delay to spare.

Commercial Interest: I am at the moment checking out a G3LLL RF clipper on an FT101B and hope to have a full write up on this unit in print very soon. With the release of the 101E, RF clippers are very much in the news. I hope to be able to write up the 101E in comparison with the B model soon also. ■

Afterthoughts

VK/ZL CONTESTS, RESULTS FOR 1974

Corrections (from Jack White ZL2GX)

Individual Band Scores:

15Mx/Phone	VK2APK	5815
	VK4VU	5430
	VK2XT	5355

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers

The Editor,

Dear Sir,

On behalf of the Light Car Club of Australia Experts Trial organisers, I wish to thank those who participated and who did a remarkable job under the prevailing conditions.

The standard of operation was high ensuring the complete safety of competitors in this highly competitive event. Saturation penetration into the bush by station VK3AWI resulted in complete coverage of 1200 square kilometres of dense bush and range. Nine control stations manned posts up to 7.30 a.m. on Sunday 10.8.75 after being placed at 3.00 p.m. Saturday 9.8.75.

A big thank you especially to Bob VK3UW who provided equipment and running gear on behalf of the Army, including a 50 foot tower, freshly painted and equipped with 4000 watts of floodlighting. Power sources were a Lister 25 kVA and a smaller VW powered 10 kVA generator also courtesy of the Army.

Thank you to the stations who gave up their time and provided the equipment on loan for use at Graytown.

Thank you in alphabetical order VK3s IZ, MK, UW, VL, AFR, ALS, AMH, AUQ, AUR, BMA, BMD, CCT, YAY, YBC, YFF, YFL, YHR, YID, YJE, YJT; ZAC, ZLK, ZLP, ZMM, ZRS, ZUP, ZVD, ZYG. John Longeru and Jenny Roper (LARA).

Steve Gregory VK3ZAZ

VHF UHF
an expanding world

with Eric Jamieson VK5LP

Forreston S.A. 5233
Times GMT

AMATEUR BAND BEACONS

VK0	VK0MA, Mawson	53.100
	VK0GR Casey	53.200
VK1	VK1RTA, Canberra	144.475
VK3	VK3RTG, Vermont	144.700
VK4	VK4RTL, Townsville	52.600
	VK4WI/1, Mt. Mowbullan	144.400
VK5	VK5VF, Mt. Lofty	53.000
	VK5VF, Mt. Lofty	144.800
VK6	VK6RTV, Perth	52.300
	VK6RTU, Kalgoorlie	52.350
	VK6RTW, Albany	52.950
	VK6RTW, Albany	144.500
	VK6RTV, Perth	145.000
VK7	VK7RTX, Devonport	144.900
3D	3DAA, Suva, Fiji	52.500

A letter comes from Colin VK8CM with some interesting information about VK8VF, the Darwin beacon, and could do little better than let you read that information as it comes.

Pre-cyclone, the 6 metre beacon at VK8VF was delivering 25 watts from a solid state transmitter. It was keyed by a digital device which at that time, was arranged to encode the simple ident. signal with which we were all familiar However, the keying system was designed and built to transpond i.e. it was capable of listening to an incoming signal and transmitting a signal report, after a suitable listening pause. Final development, in the hands of Doug, VK3UM, (ex VK8KK), Barry, VK8ZCF and Colin VK8CM, was at the stage of refining the necessary analogue-digital converter, and the provision of suitable voltage levels out of the Rx strip with a sufficiently linear response. The intention was to commission a system whose responses were of instrument quality, so that it could be used by serious amateurs and professional services as a measurement tool in propagation studies. It is easy to make a device which merely responds to the presence of a signal Accurate measurement is another thing altogether

"We can assume, I think, that the gear suffered one or more lightning-strikes during the cyclone. As well, the block-house in which the beacon is installed is less than 100 metres from the sea, so that we were not surprised to find the equipment full of sand, fine gravel and salt. The solid state transmitter was washed off and cleaned up and when voltage was applied it fired up without trouble. This must be a tremendous tribute to the workmanship of Peter VK5PV, who built it during his residence in Darwin. The keyer did not escape so lightly. Most of the ICs remained intact, but the keying-matrix and line-drivers feeding the matrix were largely wiped out On the thousand-plus diodes in the matrix somewhere between a third and a half did not survive.

"The antenna survived reasonably well. It consisted of stacked turnstiles on a pipe mast. The mast was destroyed, but the lower turnstile was intact, together with the insulator-mounting block assembly for the upper one. The Darwin Club has obtained a 30 foot triangular tower, which will be fixed to the block-house roof, and the turnstile array re-assembled on a pipe-mast fixed to the top of the tower. Coverage should improve, since the array will be some 25 feet higher than before.

"To get the beacon on the air, it has been decided to reinstate the old code-wheel keyer, driven by an NDB nav-aid motor and gear train. Since this can be made operational quite quickly, it is probable that the beacon can be re-commissioned during October/November 1975.

"Trevor, VK8ZTW has completed a 2 metre beacon and is presently 'boxing it up' This will be installed and keyed by the same system.

"The transponder concept has not been abandoned. Some re-design work has been undertaken by VK3UM and once the design is finished, a suitable PCB will be made by Colin, VK8CM and construction and assembly carried out. A reasonable estimate for re-commissioning of the transpond function would be, I think, mid-1976.

"Potential VHF activity in Darwin is not too good. As far as I know, only Barry, VK8DI and myself have 6 metre gear I have no antenna, and no place to put one, in my present temporary quarters. The 2 metre FM net is still functioning, but is a little short of 'subscribers' However, the Radio Club is full of vigour, and I am sure these problems will soon rectify themselves"

Many thanks, Colin, for that information; I am sure the VHF boys throughout Australia will await the re-commissioning of your beacon with interest, and we all wish you well with your re-establishment programme. I note with some excitement the establishment of a 2 metre beacon in Darwin in the future, and there will be plenty of others who will get excited, particularly if eventually some operators at your end will be able to transmit CW and SSB on 144 MHz. How soon before someone has "WAS" on 2 metres?

EME REPORT

Via "The Propogator" comes the report that QSL cards were exchanged between VK2AMW and VE7BBG confirming their EME contact on 12.7.75, this being the first UHF contact between VE and VK and also the first 432 MHz EME contact between these two countries. A second contact was made with VE7BBG on 3.8.75, signals peaking to 6 dB above noise. VK2AMW received 0-Rs from him VK2ALU and VK2ZEN got out of bed early for this test, which started at 2030Z.

SSB signals were heard in the noise immediately after the contact with VE7BBG on 3.8.75, but could not be deciphered. The Drake 2B receiver used as the IF channel is not basically designed for SSB, and copy of this mode would probably be better on a more up-to-date SSB receiver

That covers the Dapto Moonbounce report, but what about you other guys around the country who work EME Surely you all haven't stopped? A report for inclusion in these pages from all the EME operators and intending operators from time to time would spread the area of interest What about it chaps?

THE FM CHANNELS

In a very roundabout way a letter has arrived on my desk detailing some information on the state of the art in regard to repeaters in Western Australia, an area which does not receive much publicity (whose fault?), and also an area which has little information going east to west. However, Will VK6UU writes to fill in the gaps for the moment, and the following is a condensation of his long letter

Three 2 metre repeaters are at present in use in VK6, with another installed awaiting a licence. Perth city uses Ch. 1 on an escarpment 1200 feet a.s.l and 25 km SE of Perth. Ideal for coastal working, but limited to about 80 km inland. Runs 25 watts, MCW ident, call sign VK6RAP, and time out set for 5 mins

Albany uses Ch. 2 operating from Mt. Barker 1400 feet a.s.l. and 50 km north of Albany. Coverage is 100 km radius, and runs about 40W Callsign VK6RAA. A Ch. 4 repeater is installed at Wagin, 200 km south of Perth, location 1300 feet a.s.l. providing circular coverage of 70 km. Runs 12 watts, call sign VK6RAW.

Three other repeaters are planned, the one awaiting licence is on Ch. 2, located at Wireless Hill, 10 km south of Perth, 300 feet, a.s.l., and will fill in the blank spots of Perth Ch. 1 Another site under discussion is at Mt. Wells, 110 km SE of Perth, and another at Bunbury 200 km south of Perth.

Will makes a plea for increased information on the areas of coverage of the various repeaters throughout Australia, and suggests a suitable map in AR could help the various travellers whether they go east or west, north or south. What do you think George, VK3HV (ex VK3ASV)?

While still on the subject of repeaters, there are an interesting few lines in "Forward Bias" by Andrew VK1DA, and they are worth 'repeating' here.

"A complaint heard recently was that there is little activity on 2m FM channels. Yet seldom do I hear anyone calling CQ. Saying 'VK1XYA mobile listening on channel' is NOT an acceptable form of calling CQ.

"Pressing the button for half a second and hearing the repeater ident is NOT an acceptable way to use the repeater Unmodulated carriers, while legal on some bands, are downright ANTI-SOCIAL when transmitted on net channels.

"If you expect people to monitor the repeater channel and reply to your calls, don't drive them mad with repeater idents caused by your button-pushing without ident My reaction to blips is that they are transmitted by flips.

In other words, the absence of intelligence on the carrier implies the absence of intelligence in the operator. SO — always announce your call sign If wanting a contact, call CQ . . . If testing say so, and TRY and avoid prime channels" Food for thought, eh?

And might I add my own comments **Don't forget to leave a 3 second pause between overs to allow someone with an urgent message to get through**, or to quickly call someone else. Also, many long conversations are carried out between metropolitan stations via the repeater — wouldn't it be courtesy to go to some other channel to conduct such conversations, or better still, why not shift down to the lower end of 2 metres or go to 6 metres It's just as easy there for stations almost with line of site as so many are in the cities, anyway, there's always a case for making more use of the tuneable portions of 6 and 2 metres. Don't be selfish!

FATHER AND SON TEAM

A word of welcome to David VK5KK, who received his full call sign just in time for his 16th birthday on 17th August Congratulations on such a fine effort, David, and I know from persona contact you will be a very valuable member of the amateur fraternity. David operates on both HF and VHF which is what we like to see David is the son of Keith VK5SV, who also changed his call recently from that of VK5ZMK, at Wasleys. Keith has been known for years for his whopping big signal on 6 and 2 metres, and despite the full call, still plans to operate VHF as well This father and son team celebrated their new call signs by really getting into the recent RD Contest and between them notched up 1570 points for VK5. Truly valuable people to have around, and we wish them both a very happy period combining HF and VHF.

METEOR SCATTER

Being little to report on 6 and 2 metres this month which isn't unusual, I feel the several paragraphs of Joe, VK7ZGJ, in "QRM" on the subject of meteor scatter should be of interest, as it refers to meteors and why you have to get up so early in the mornings for best results.

"Meteors are small bodies, most of which orbit the sun. Their orbital velocity lies between 11.3 km/s (minimum velocity for a solar orbit) and 72 km/s (the velocity required to escape solar gravity) The measured mean velocity is 40 km/s. On the other hand, the orbital velocity of the earth is approx. 30 km/s

At 0600 local time at the point of observation, the orbital velocity of the earth is directed towards the zenith, and the relative velocity of the earth is directed towards the zenith too, and the relative velocity of meteors in relation to the atmosphere lies between 41 and 102 km/s with mean value of 70 km/s. At 1800 local time at the point of observation, the orbital velocity of the earth is directed towards the nadir, and some meteors are unable to catch up with it, while others arrive at velocities between 0 and 42 km/s, with a mean value of 10 km/s. Therefore, the number of meteors encountered and their velocity are considerably greater at 0600 than at 1800

The deceleration of meteors by the relatively low layers of the atmosphere produces intense heat, which causes their combustion at a greater height and more rapidly if their initial velocity was greater The combustion products are ionised and form a meteoric trail that is capable of reflecting radio waves. Very thick trails can be seen with the naked eye at the moment of their formation, meteoric ionisation occurs at altitudes between 80 and 100 km, with a maximum ionisation occurring immediately after the trail formation altitudes between, has been formed, the trail then begins to expand and to diffuse outwards Its electron density decreases and it is no longer capable of reflecting high frequencies.

At the same time, the trail is distorted by atmosphere disturbances. In the case of a large meteor the head of the trail reflects a considerable amount of energy Because of the motion involved, this reflection occurs with a change in frequency due to Doppler effect. Waves reflected by the head of the trail interfere with those reflected by the body

of the trail, thereby ascends again On 52 MHz it sounds like a 'ping' Now you know why one carries out meteor scatter contacts at such an unearthly hour" Thank you, Joe

THE VK5 VHF GROUP FIELD DAY

OBJECT

The object of the field day is to encourage the use of portable mobile operation in South Australia and Australia on bands allocated for VHF use (52 MHz above)

DATE

Saturday and Sunday 6th and 7th December, 1975.

DURATION

Section 1—24 hours duration from 0600Z on Saturday 6.12.75 to 0700Z Sunday 7.12.75. A break from 0300 to 0400 on Sunday 7.12.75.

Section 2 is a 6 hour duration and has two Sections of each 3 hours. First section 0000Z to 0300Z. Second section on 0400Z to 0700Z.

DEFINITIONS

Portable stations

Portable stations must not be established on site with any equipment 24 hours prior to the start of the field day.

All power used for the operation of the station, must be delivered from an external power source, other than the normal electricity supply mains.

Mobile Stations

Must operate with equipment fitted within or on the vehicle, this includes antenna systems, power etc

If a normally mobile station operates from a stationary location, the station will be classed as being a portable station for scoring purposes.

Fixed Stations

May only contact Portable or Mobile stations. Fixed station to fixed station contacts cannot be claimed for scoring

Single operators will compete against other single operators — they will not be required to compete against multi-operator stations.

Multi-operator stations are permitted, but only one operator may operate at any one time for the purpose of scoring, i.e. it is not permitted to have a contact in progress on more than one band at a time

SCORING

Score 1 point/2 kilometres but for those contacts greater than 1000 kilometres 1 point/10 kilometres additional to the above.

Oscar Scoring is by equivalent Direct distance (see general note).

For contacts on:

6 metres multiply distance score by 1
2 metres F3 multiply distance score by 1
2 metres other modes multiply distance score by 3
432 MHz multiply distance score by 4
576 MHz multiply distance score by 6
all above multiply distance score by 6

For Oscar satellite:

multiply distance score by 2

GENERAL

Any station may be worked more than once on the same band provided that a period of two hours has elapsed. However cross band operation is permitted and is deemed as a separate contact and subject to the two hour rule. Thus you may work a station on a band then work that station cross band To work again the same procedure two hours must elapse again

Operation via EARTHBOUND repeaters or translators for scoring is not permitted, but they are allowed for liaison to establish other contacts.

No cross band operation on frequencies of 10m and 2m (i.e. Oscars mode A frequencies, etc.) are allowed although full Oscar facilities are to be encouraged.

All stations must operate within the terms of their licence.

Stations working the 24 hour duration are also eligible for the 6 hour duration Stations working the 6 hour duration may submit logs for either or both, first or second sessions of the 6 hour duration. The 24 hour duration stations are not eligible for either first or second sessions of the 6 hour duration separately but if submitting section 2 log must be for full 6 hours.

LOGS

(1) Mark clearly which Section or session you are competing in.

(2) A copy of your log will be required for scoring purposes and must contain information such as —

Time: in GMT.
Location of station worked.
Frequency/bands used during the field day.
Modes of operation used during the field day.
Log/QSO are as five figure group (or 6 with CW) of RS(T) and a contact number commencing at 001 and increasing by one number per contact.

The VHF Group Committee are the judges. The judges' decisions are final and no correspondence will be entered into.

Send your logs with an attached note giving details of:

Station location, equipment used, number of operators, points claimed, sections and/or sessions entered, and signed by the holder of the callsign of the station. Any constructive suggestions for improvement to the Contest will be welcome.

All logs to be received no later than 5.1.76, to be sent to:

Mr. J. INGHAM VK5KG
37 Second Avenue
Sefton Park, SA 5083

That will have to do for this month. Closing with the thought for the month: "Conceit is God's gift to little men".

The Voice in the Hills

Contests

with Jim Payne, VK3AZT
Federal Contest Manager,
Box 67, East Melbourne, Vic., 3002

CONTEST CALENDAR

October

4-5	VK/ZL Oceanic phone
11-12	VK-ZL Oceanic CW
12	RSGB 21/28 MHz phone
15-16	YL Anniversary CW party
17-19	Scouts Jamboree
18-19	RSGB 7 MHz CW
25-26	CQ WW DX phone

November

1-2	RSGB 7 MHz phone
6-7	YL Anniversary phone party
8-9	European RTTY DX
9	Czechoslovakian
8-9	ARRL CW sweepstakes
22-23	ARRL phone sweepstakes
29-30	CQ WW DX CW

YL ANNIVERSARY PARTY

CW 1800 GMT Wednesday to 1800 GMT Thursday. Phone 1800 GMT Thursday to 1800 GMT Friday.

Thursday is 38th YLRL contest for YLs only. Contacts with OM stations do not count. All bands. CW & phone are separate contests (see contest calendar). Scoring is one point per QSO between stations within an ARRL section, and between DX stations. Two points if between DX and ARRL section stations. Same station can be worked only once. Multiplier is number of ARRL sections and DX countries worked. Also a low power multiplier of 1.25 if input is 150 watts or less, 350 PEP on SSB.

1st, 2nd and 3rd in VK get certificates. Two gold cups for winners phone and CW contests. Also a plaque for highest combined CW/phone score. Logs to Myrtle Cunningham, WA6ISY, 1105 East Accasia Ave., EL SEGUNDO, CA 90245 by November 24.

CQ WW DX CONTEST

Frank W1WY advises that there are no changes to last year's rules.

REMEMBRANCE DAY CONTEST

No doubt as I write these notes many other hams or their XYLs perhaps, are writing up their contest logs. About 120 had arrived by Friday (August 22) and there are some fine scores. However, some country members have complained bitterly and the following letter explains the situation.

"Dear OM,

Once again the RD is over. I must wish you all the best with your job.

Last year I wrote and protested over the discriminatory nature of rule 5 (e). I must once again take up the cudgel on behalf of the country operator I understand the reasoning behind all of these rules I think but do believe that these 'concessional' rules should be grouped in their own section.

Consider the position of myself and — both of us country stations. 52 MHz is a no-no, except under inversion conditions. 7 MHz sometimes opens for a couple of hours to the city, certainly not at that time of night. For all practical purposes the situation on 21, 27 and 28 MHz is the same as applies on 52 MHz, none.

Which leaves us 1.8, I ask you, what chance does a country (distant) station have of being heard in the city (and that s where the numbers are) between 0300 and 0759? Try it sometime.

To reiterate; I can appreciate the reason for inclusion of the above, but give us country blokes a chance. We'd like to win the contest too.

PS. You will notice I went to bed between 1710 and 2015. If you don't know why, after reading the above, I have been wasting my time "

Fair enough, but the RD as I understand it is a team effort within each call area, and the main idea is to permit and promote every opportunity for making QSOs. There is another contest for individual effort and for contestants having the necessary interest, and competence, perhaps a remote country QTH may provide some advantage. **Anyway, one cannot please everybody and the RD rules and scoring are too complex already.**

The VE/W contest rules may be a pointer to a suitable alternative and therefore are reproduced here:

CW — 0000 to 2400 GMT Sat. Sept. 20. Phone — 0000 to 2400 GMT Sun Sept. 21.

The VE/VOs will be working the W/Ks in the "General" portion of the US bands in this one

This year's contest is divided into two classes, CW and phone, with separate operating times for each. Therefore each is logged separately

Only 18 hours total operating time may be used in the 24 hour period of each contest. The minimum off period is 15 minutes, which must be shown on log.

The same station may be worked on each band for QSO and multiplier credit. There two types of entries, single and multi-operator

Exchange: RS (T), year first licensed and QTH, ARRL section for W/K, geographical areas for VE/VO (9 provinces plus Nfld., Lab., Yukon, N.W.T.).

Scoring: Two points per QSO, VE/VOs use US ARRL sections worked on each band for their multiplier. W/Ks use Canadian areas, (max. of 13 on each band). In addition, a multiplier of 10 has been instituted for W/Ks to equalize the W/VE scores. (QSOs x area multiplier x 10 = Final Score.

Awards. Certificates to the top scorers in each class in each section if there are at least 3 entries for that section (Min of 25 QSOs).

Summary and check sheets are a must as is a declaration that all rules and regulations have been observed. A dupe check sheet is required for logs with 200 or more contacts. Reduction of claimed score by 2 per cent or more because of duplicate contacts and etc may mean disqualification.

Fred, VK3ARK, wrote that he enjoyed the 1975 contest and commented "that with a bit of luck we would get our 1000 logs" Roy, VK4RU, has sent a check log, all CW, for 92 contacts. Glen VK2AGM, asked "what happened to the VK8s this year? Maybe they were around but I only worked two" Here is a completely acceptable comment, "Sorry I didn't get more contacts but I had to work most of the night and day. I enjoyed the couple of hours available" That came from the Rev Ron VK3AIS. Finally, a comment from Wayne, VK4AXJ, who claims 332 points for 50 CW contacts. "My first contest. I have only had a licence this year I share my father's station, his call is VK4XJ I am 15 years old". A certificate for a fine effort will reach you shortly, Wayne

Next years RD? Peter, VK3QI, concluded his interesting letter " but the problem of novices is a ripper which I would not have for all the tea in ".

BERU CONTEST RESULTS

The news that the 1975 Contest wou d be the last under the then existing ru es prompted a large number of VKs to take part, in conditions that could only be described as fair and to send in logs, 26 in all.

Results were:

Placing	Call	Score
16	VK3MR	2002
23	VK2BPN	2520
29	VK4XA	2256
38	VK7CH	1728
43	VK3ZC	1470
44	VK7BC	1465
51	VK6RU	1350
52	VK2BJL	1319
56	VK2VN	1240
66	VK5BO	1005
77	VK2NS	821
79	VK4KX	795
81	VK7RY	775
85	VK4MY	645
87	VK2IV	638
88	VK3XB	635
92	VK5KJ	560
94	VK5KL	550
96	VK2HC	505
97	VK3YD	445
102	VK4AK	330
104	VK5RG	255
105	VK5KO	240
106	VK2HW	215
109	VK3RJ	100
112	VK6HO	25

AUSTRALIAN AWARDS

Snow Campbell VK3MR wins the silver medallion for the leading VK, while F E. Nicholls VK7RY, takes out the bronze medallion for middle placing in the VK field

The great majority of entrants expressed opinions against any sign ficant changes to the contest, and although no firm decis on for 1976 has been made, there may yet be little change from the very satisfactory competiti on rules and scoring system of the past ■

Awards Column

with BR AN AUSTIN VK5CA
P O Box 7A Crafers SA 5152

YO AWARDS PROGRAMME

Roman an Rad oamateur Federation displays an interesting awards programme YO awards are issued for d fferent modes. CW, AM, SSB, RTTY or mixed and for different bands as well 3.5, 7, 14, 21, 28 MHz, any combination being cons dered as a separate award. Val d contacts after 23rd August 1949 The appl cation which is of GCR k nd (no cards are needed) and a fee of 7 IRCs or the equivalent foreign currency ($1.00) should be mailed to Romanian Radioamateur Federation, P O Box 1395, Bucharest 5, Romania.

"YO-BZ" YO — BALCANS ZONE OF PEACE

This award is issued for working radio amateur stations from LZ, SV, TA, YO, YU ZA as follows.

Class of the award	Number of countries
I	4
II	3
III	2

"YO-DR" YO — DANUBE RIVER

This award is issued for working on two bands different stations located in countries along the river Danube FR of Germany, Austria Czechoslovakia, Hungary, Yugoslavia, Bulgaria, Romania USSR as follows

No. of QSOs from each country worked 2
No. of YO QSOs 3

At least 3 QSOs out of the abovementioned contacts must be with stations located in cities just on the Danube river

"YO-20Z" YO — ZONE 20

This award is issued for working countries located in zone 20 Bulgaria, Greece, Cyprus, Israel, Jordan, Lebanon, Romania, Syria and Turkey, as follows.

Class of the award	Number of countries
I	6
II	4
III	2

In all cases Romania is obligatory to be among the worked countries.

"YO-25M" YO — 25 deg. MERIDIAN

This award is issued for working the following countries situated on the meridian 25 deg. East Norway, Finland, USSR, Romania, Bulgaria, Greece, Libya, Arab Republic of Egypt, Sudan, Centrafrican Republic, Zaire, Rwanda, Burundi, Zambia, Rhodesia, Botswana, Republic of South Africa, as follows.

Class I	12 countries
Class II	8 countries
Class III	5 countries

In all cases Romania is obligatory to be among the worked countries.

"YO-45P" YO — 45 deg. PARALLEL

This award is issued for working the following countries situated on the parallel 45 deg. North USA, Canada, Is. of St. Pierre and Miquelon, France, Italy, Yugoslavia, Romania, USSR, Peoples Republic of Mongolia, Peoples Republic of China, Japan as follows:

Class I	8 countries
Class II	6 countries
Class III	5 countries

In all cases Romania is obligatory to be among the worked countries.

Any further information will be supplied by the Romanian Radioamateur Federation.

Please note that the recent increases in Postal charges make it very difficult to keep the Awards programme going without subsidy.

Accordingly, return postage with all correspondence would be appreciated.

If registration of cards is required, a sufficient remittance must be included with the cards to cover the cost, otherwise ordinary mail will be used. ■

QSP

WISDOM

Three tidbits adopted from ARNS, June 1975. "In almost every QSO truth is the first victim" "They always say there is nothing busier than an [illegible] rumour Speaking of an idle person there is always " "If you are studying for your AOCP remember that hard work never killed anyone, on the other hand resting didn't either" ■

Key Section

with Deane Blackman VK3TX
Box 382, Clayton, Vic., 3168

I promised some time ago to match the article on Russian morse with one on Japanese morse, and here it is.

The way in which the Japanese write their language, and hence send it by telegraphy, differs very considerably from English. The difference is much more than is apparent from the very unfamiliar script, and an understanding of the nature of this difference is necessary to realise the basis of the Japanese telegraph code.

The real language of any race is its spoken language. The business of writing it down, although of incalculable value for transmitting information between people separate in space or time, is secondary. The way in which different languages have elected to write down their spoken words varies greatly. All European languages now use the system of a small set of characters (the alphabet so called in English) each representing roughly one sound. These characters are divided into two classes, called vowels and consonants. The pronounceable bits of words, the syllables, are then generally represented by consonant-vowel combinations of these characters (letters).

However natural this may seem to speakers of English (and it certainly is a very efficient method (of writing) there are other means of putting on paper the spoken words of a language. The opposite extreme to English is probably represented by Chinese. Roughly speaking in Chinese there is a separate "letter", a little picture called an ideograph, for each word required. The inherent difficulty of this scheme for English, which boasts of half a million words, is clear. There are far fewer words in Chinese, but there are still over 20,000 ideographs. Even a moderately educated person will not know all of these in the same way as even a moderately well educated person will use, perhaps only a tenth of the words available to him in English. One advantage of the ideograph system is that, being quite unrelated to the phonetics, although I may sound the word which I associate with a particular ideograph quite differently from you the meaning of the symbols remains the same for both of us and we can write to one another even though we may not be able to talk to one another. This situation is quite familiar. If I send "QSL 599", the other chap will read that in his own language, even though I think of it as having the English meaning "I acknowledge receipt of your report RST 599".

In part, Japanese is similar to Chinese in its script. Written Japanese does represent the spoken language by ideographs, only some of which have the same meaning in Chinese.

In part, though, Japanese has broken away from this system and in its writing uses as well as the ideographs, a form of syllabic writing. In syllabic scripts, of which Japanese is not the only example, the sounds which in English we would represent by the letter combinations "TA", "TE", "TO" etc. are each represented by a single special symbol of their own. English has almost no examples of such usage and perhaps the only one which is not confusing is the use of "&" for "AND". Japanese, like English, has five vowels and a dozen or so consonants so it is clear that there will be quite a number of symbols needed to represent the various sounds. In fact there are in Japanese nearly 80 different sounds.

ワ WA	ラ RA	ヤ YA	マ MA	ハ HA	ナ NA	タ TA	サ SA	カ KA	ア A
ヰ WI	リ RI	(I)	ミ MI	ヒ HI	ニ NI	チ CHI	シ SHI	キ KI	イ I
(U)	ル RU	ユ YU	ム MU	フ FU	ヌ NU	ツ TSU	ス SU	ク KU	ウ U
ヱ WE	レ RE	(E)	メ ME	ヘ HE	ネ NE	テ TE	セ SE	ケ KE	エ E
ヲ WO	ロ RO	ヨ YO	モ MO	ホ HO	ノ NO	ト TO	ソ SO	コ KO	オ O
ン N									

TABLE 1

電 = DEN = electricity
話 = WA = speaking
= telephone

DE	て″	デ″	わ	ワ	WA
N	ん	ン			
	hiragana	katakana	hiragana	katakana	

TELEGRAPHY.

FIGURE 1

゛	パ PA	バ BA	ダ DA	ザ ZA	ガ GA
゜	ピ PI	ビ BI	ヂ JI	ジ JI	ギ GI
	プ PU	ブ BU	ヅ ZU	ズ ZU	グ GU
ッ (TSU)	ペ PE	ベ BE	デ DE	ゼ ZE	ゲ GE
ー	ポ PO	ボ BO	ド DO	ゾ ZO	ゴ GO

TABLE 2

If you look at a bit of Japanese writing, then, you will see a mixture of ideographs and of words "spelled" out in syllabic form. The symbols representing the syllables the Japanese call the "KANA". There is more than one Kana. The one which has become generally used since 1945 is called the Hiragana (for -gana read -kana), and is a sort of Japanese cursive script. The kana I am going to describe here is a rather more formal script, called the Katakana, and is used for domestic telegrams and other purposes.

The Japanese have economised somewhat, in order to reduce the number of different symbols in the Katakana, by a ruse. There are 48 basic Kana which represent the sound of the English letters W, R, Y, M, H, N, T (usually), S, and K with the five vowels A, E, I, O, and U. Plus the vowels themselves and the isolated letter N. Each of these sounds (consonant plus vowel, and the single ones) has a separate character to represent it. I will mention the complication associated with "T" in a moment. There are a further 25 sounds to be represented, being those of P, B, D, Z (or sometimes T) and G combined with the five vowels. These sounds are represented by adding to one of the 48 basic Kana one or two diacritical marks — either ", which is called the Nigori, or by °, which is called the Hanrigor.

If you are still with me the two tables which show the basic Kana (table 1) and the modified Kana (table 2) may be less puzzling. Laid out there, in my inexpert script, are the 73 members of the Kana and some added marks.

Given this method representing the language it is of course natural to develop telegraph characters to stand for the Kana. The dash-dot equivalents of the basic 48 Kana are included in Table 1. With 48 characters to be represented instead of 26 in English, the number of units (dashes or dots) in each character is on average more. The additional Kana in Table 2 are sent by using a special code symbol for the diacritical mark in conjunction with one of the basic Kana from Table 1. I would guess that the mark is sent first.

It is pretty obvious how the above system operates with hand keying, though clearly both parties have to know it. I understand that teleprinters which operate in the Kata Kana are widely used, certainly for internal telegraph traffic and for all I know, for diplomatic traffic also. But the recognised alphabets for the International circuits are the morse familiar here (not the American variety) and an agreed Roman alphabet (the one in which this is written) for use on teleprinters. The Kana symbols can be represented as combinations of Roman letters as I have done in the tables, so that a text written in the Kata Kana can be transliterated into Roman letter pairs and these sent by the standard teleprinter. The Japanese call this representation of their language "Romanji". To illustrate the various methods of writing I have described, figure 1 shows the word "telephone" written in Japanese in four different ways — ideographically, using the Kata Kana, using the Hiragana and finally in Romanji. The two syllables incidentally, mean "electricity" and "speaking". Hence "telephone".

To clear up a couple of details I skipped over, the preferred forms of "Ti" and "Tu" are "Chi" and "Tsu", these representing the sounds better. For the same reason "Si" is represented by "Shi" and "Hu" by "Fu" and the forms "Wi", "We" and "Wo", I think are out of use. The forms "Ya" etc make combination symbols with other Kana — but perhaps that is getting a bit away from the problems of telegraphy. You will notice, though, that the letters "L", "Q", "V" and "X" do not appear at all in the language. The absence of "L" especially makes the representation of words like "Ireland" difficult in Romanji. "Ireland" becomes "A-I-RU-N-DO".

On the distinct, though apparently related, problem of transmitting Chinese by telegraphy, I have not a great deal of information. So far as I have been able to determine, Chinese ideographs are represented by numerical groups and it is these groups which are transmitted. One informant told me that it is not necessary for you to do this — at least for telegrams. You hand in your text in ideograph form, and the post office staff convert it into numbers from a standard lexicon they have. I suppose the staff at the other end write it back into ideographs for your addressee.

Many people have helped me with material for this article. In particular VK3IZ, VK3TJ, Peter Hocker of the Law School at Monash University and the American Cryptogram Association, to whom I extend my thanks.

20 Years Ago

with Ron Fisher VK3OM

OCTOBER 1955

Horizons Ahead The editorial page of the October 1955 issue of Amateur Radio made the rather startling suggestion that perhaps we should be looking towards space for our future communications. Of course artificial satellites were still in the realms of science fiction, so the moon was the suggested medium. A few Australian amateurs have in the interim been successful in doing just this. Satellites however have made the job easy for the average amateur. What does the next twenty years hold in store for us. In 1955 most amateurs were thinking of more immediate problems like TVI. Hans Ruckert /K2AOU, gave us food for thought with his article A Transmitter, with Low Harmonic Output. Hans used high selectivity and double tuned circuits between all stages.

The Extended Lazy H Antenna Wal Salmon, VK2SA, showed how to modify an extended double zepp to give more gain as well as multiband operation. Of course Wal is still producing new ideas on antennas as reference to recent issues of AR will show.

Band Spreading and all That: A down to earth article on coil calculations winding and determining the right amount of coverage for your favourite amateur band. V. J. McMillan VK2AWN showed just how it could be done. Skeleton Slot Antennas were very much the in thing and Don Knock, VK2NO followed up an earlier article with more applications ideas.

The Geloso PI-Coupler Tank Coil was the subject of a Trade review. No doubt hundreds of these were used in transmitters with the companion VFO. The idea of using VOX with an AM transmitter seems strange, however it was tried with some success. N. L. Southwell VK2ZF, showed how any relay controlled transmitter could be VOX controlled with anti-trip and all.

The All Models Exhibition held every three years in the Exhibition Buildings Melbourne was an ideal place to demonstrate Amateur Radio to the public. A full description of the 1955 WIA stand complete with photo appeared in the October 1955 AR.

Robert Black VK2QZ presented some statistics on the incidence of BCI in the Sydney area, and in so doing formed a few conclusions on how we might fare when television was with us.

Note that I received my first mention as a member of the Technical staff of AR. Apart from a few years around the mid 1960's I have been at it ever since.

Trade Review

Scalar Distributors Pty Ltd have announced the availability of 4 channel low loss transmitter combiners which allow simultaneous operation of four transmitters into a single broad-band antenna. They are available in frequency ranges from 145-174 MHz and 450-512 MHz. The power limits are around 125 watts with a minimum frequency separation of 30 kHz (VHF) and 75 kHz (UHF).

Also available are new style 2100 series switched RF attenuators. The new series provide switched attenuation from 1 to 100 dB in steps of 1 dB. Models operate from DC to 250 MHz with either 50 or 75 ohm characteristic impedance.

Full descriptive literature is available. ■

IONOSPHERIC PREDICTIONS

WITH LEN POYNTER VK3ZGP

In presenting the predictions for October, I am trying a new format that hopefully will give both Eastern and Western path openings, comprising both first "F" layer and mixed first and second mode. The lower symbol being Eastern VK, the upper symbol being the Western VK predictions. I am hoping with the small print to achieve semi-bar type lines to enable some ease in reading.

For this month we will try to show some interesting path openings, and introducing 80m to the list for those interested. All times are universal times.

At this period of the cycle "The crystal ball" is the order of the day. It being almost impossible to be even marginally correct. The daily sunspot variations are rising significantly at the time of writing. The July mean of 28.3 will probably be endeeded by August, early August the solar flux reached 125 and slowly subsided to around the high 70 mark.

For those following the solar flux and "A" index ex WWV, and keeping records, it might pay to arrange your records in solar rotation periods. The sun rotates approximately every 27 days. Period 1943 starts on September 30, period 1944 on October 27. From your records it is handy to see the recurring events and be in the position to take advantage of the good periods and watch TV or take the YL or XYL out in the bad periods.

Latest Zurich Observatory figures show July prov. mean of 28.3. First smoothed mean for January '75 as 23. Predictions up to December '75 have been raised approximately 4 points. Informed opinion still rates March '76 as the bottom, the way the trend continues they could well be right.

There is quite a deal of comment around the world regarding the large quantity of geomagnetic storms over the past two years. From my short records it certainly shows. The almost monotonous rise and fall of solar activity and particle radiation has its inevitable effect on DX over past year.

At the time of writing, "The giant X-ray" source observed by satellite and noted in the press has been detected in VK, however no significant change has been noticed in propagation conditions to date.

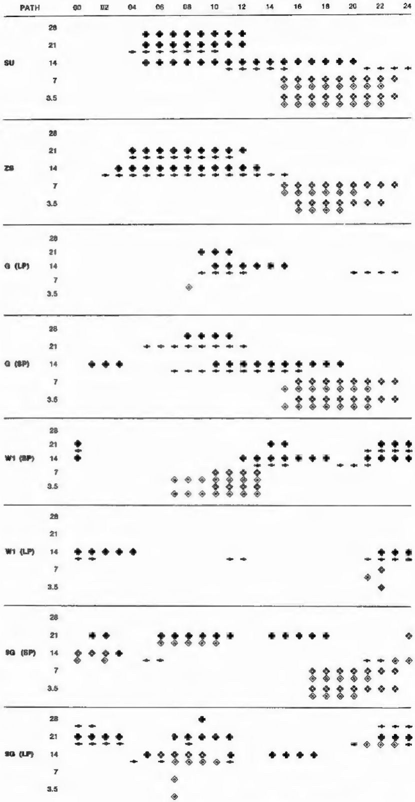
I would be pleased to have any comments from those who use the predictions as to their accuracy, and to the method of presentation. More so, I would be most interested to hear from DXers who note any abnormal behaviour of any of the bands at any particular time. It will greatly assist me collate conditions against my indices. I am slowly building up quite elaborate records of solar flux and the "A" index. The latter from three sources, namely WWV, locally from Melbourne and the world mean.

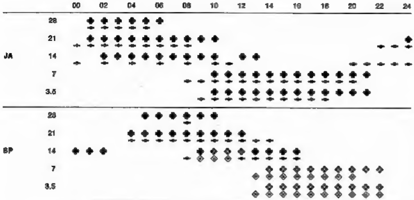
When charted along with the daily sunspot number, the whole effort looks worthwhile, however I only have one avid worker feeding back band conditions. I hope by the end of this year to have some worthwhile contribution to the do-it-yourself, prediction expert.

Just a word in closing, October looks interesting as there could be some 28 MHz openings and perhaps 21 MHz could show some life. Try giving a call when the band appears to be dead. The other guy could well be tuning. It's surprising how much DX has been worked on an otherwise dead band. Don't forget, your comments please.

NOTES:

Each column:
Upper row ✚ or ❖ from Western VK
Lower row -•- or ◈ from Eastern VK
✚ or -•- — possible on some days, but not more than 50 per cent of the month.
❖ or ◈ — possible on at least half of the month using first and/or second F modes some days will be the best times only.
Predictions courtesy I.P.S. Sydney. ■





LARA

LADIES AMATEUR RADIO ASSOCIATION NEWS

Since the first LARA article appeared in last month's issue of AR, state LARA groups have flourished in VK4 and VK5. It is hoped that notes from these two groups will appear in next month's AR. Interest in other states has steadily increased, and LARA will be truly Australia-wide within the next few months.

LARA skeds are becoming very popular with licenced lady amateurs and SWL's, however we have been informed that in one or two cases we have been guilty of "ungentlemanly" behaviour by holding LARA skeds on a frequency and at a time when it is normally used by another net. We apologise for any inconvenience LARA skeds have caused.

The skeds are held at; 8.00 p.m. EAST, Monday evenings on 3650 kHz plus/minus QRM and 11.30 a.m. EAST, Sunday mornings on 7065 kHz plus/minus QRM.

VICTORIAN DIVISION NEWS

The second General Meeting of LARA (Vic) took place on August 23, 1975. It was decided at the meeting to produce a quarterly LARA (Vic) newsletter to be sent to all LARA members and interested groups. The newsletter will contain a message from the Victorian President, editorial comment, news of future LARA events, proposed LARA involvement in amateur activities such as conventions and rallies, a calender detailing future LARA fixtures, details of the following three general meetings, membership forms and articles of general interest.

To meet general administrative expenses and the cost of the newsletter, an annual membership fee of $2.00 will be levied from each member. If the newsletter is not required (as in the case of an associate member whose wife/girlfriend is a full member of LARA (Vic) the annual membership fee will be $1.00.

The LARA foxhunt held on August 3, was a great success. Congratulations to Irene Robinson and OM for a series of hair-raising hunts and to Jean Truebridge and team member VK3 YAP for their excellent effort in winning. The next LARA foxhunt will be held on October 26. Details may be obtained from the secretary.

A delegation of LARA (Vic) committee members will attend the South West Zone convention over the weekend of October 4/5, and the Warrnambool Hamfest over the weekend of November 1/2. Ladies interested in LARA in those areas are welcome to come and have a chat to us about LARA and find out "what's in it for them".

For any information on Lara activities contact The Secretary, C/o 15/10 Brook St., Hawthorn, Vic., 3122. ■

QSP

WARC 1979

"North Atlantic would like to increase the international BC allocations between 3 and 27 MHz by another 7 MHz at the forthcoming world conference.. That's more than twice they're presently allocated". Ham Radio, June 1975. ■

Hamads

- **Eight lines free to all WIA members.** $9 per 3 cm for non-members.
- Copy in typescript please or in block letters to P.O. Box 150, Toorak, Vic. 3142.
- Commercial advertising is excluded.
- Closing date: 1st day of the month preceding publication. Cancellations received after about 12th of the month cannot be processed.
- QTHR means the advertiser's name and address are correct in the current WIA Radio Amateurs Call Book.
- The current WIA Callbook is the 1975 edition.

FOR SALE

FT200 Transceiver and power supply, 12 months old. Condition and function equal to new, has permanently attached blower for cooling final stage, $370 ONO. V. Kerr, Box 237, Charleville, Q. 4470.

2M FM Carphone Rx. AR model — wired, tuned; all. case, incl. spkr. and IF xtal, $59. Also 2M FM Rx in parts, no case or spkr., $47. Variable PSU 0-15V, 1A, regulated, fully metered, $18. Power transf., 18V at 10A, $18. 2M ⅝W mobile whip, $4. L30174. P.O. Box 1, Ferntree Gully, 3156.

Complete Service Manual for the R5223 and AR88 Communication RX, includes circuit diagrams and full information, $15 each. P.O. Box 141, St. Kilda West 3182, Vic. Ph. (03) 699 2400 A.H.

Swan 500 Deluxe 5 Band Tx, 480 watts PEP plus PSU/speaker unit, VGO, includes transistorised VOX/BK CW adaptor, upper/lower SSB xtal calibrator, mic., CW sidetone facility added, $350. T. Foster, VK3GM, QTHR.

Robot SSTV Monitor and Camera, complete with lens, tripod, cables, manuals, as new condition, $547. VK3CR, QTHR. Ph. (03) 772 4039.

Heathkit Model SB220 10-80m linear amplifier, $400. VK2AQW, QTHR. Ph. (02) 449 3538.

Equipment Rack, 5 ft. high, standard 19 inch mounting, 15 inches deep, $8. VK2AAB, 28 Redgrave Rd., Normanhurst, 2076. Ph. (02) 487 1428.

SWR Meter, Hansen, as new $10. Home brew solid state oscillator, all bands 1.8 MHz to 29.7 MHz, $12. Home brew GDO 200 kHz to 300 MHz accurately calibrated, $25. 27 MHz valve transmitter and converter with xtals, no modulator or power supply, $15. VK3AOH, QTHR. Ph. (03) 49 6224.

Power Transformer for FT-200, brand new, cost $68, sell best offer plus freight ex Alice Springs. VK8FB, Yuendumu via Alice Springs, 5750.

Yaesu FL200B Tx, FR100 Rx, complete 80m-10m station. Excellent condition, $325. VK3AQL, QTHR, Post Code 3149. Ph. (03) 277 5623.

Heath HW 32, $100. 27 MHz T/R AC or DC, $50. 144 MHz AM Tx 25W, xtal of VFO, $60. MR10B Hi Bnd., $30. MR20B Hi Band, $48. MR10B Lo Bnd., $30. Plessey B47 T/R 23-38 MHz, $60. 3" CRO, $15. 432 ATV Tx Color Mod. & Sub Carrier Unit, $90. Paton VTM, $40. VHF Sig. Gen. 80-220 MHz, $40. W. War II Mine Detector, antique, $30. No reasonable offers refused, VK2AJY, QTHR.

Silent Keys

M. F. TIERNEY	VK2ZRT
D. W. BRIDGE	VK6NW
C. T. RYLATT	VK2BIC

FT101B, hardly used, complete with SP101 matching speaker, handbook, microphone, etc. $500 ONO. Yaesu FR50B ham bands only receiver, with handbook, brand new, $200 ONO. Ph. (02) 371 7681 A.H.

Yaesu FT100, mint condition, less than 50 hrs. operation, $330 or near offer. VK3ASC, QTHR.

40 ft. Oregon Mast, 4 in. x 4 in. at base, tapers towards top, any offers. Delivery can be arranged. VK2DT, 2 Patya Close, Epping 2121. Ph. (02) 868 1131.

Yaesu FT401, spare finals, Yaesu desk mic., plus Spectronics digital frequency display, $500 the lot. Eric Bierre VK2BEK. Ph. 358 3491, Sydney.

SB-33 Single Sideband Transceiver, transistorised, except for driver and two output tubes, 200 kHz on 15, 20, 40 and 80m — 240V to 110V transformer, microphone & manual, $220.

Pye Lynx transistorised TV Camera with 1 in. Vidicon and full service manual, no lens, $120.

TV Projection Unit, Schmidt mirror system and 2 in. picture tube, $20. R. Neil, VK3ZAN, 11 Xavier St., Oak Park, 3046.

FTDX 400 TXCR, mint condition, excellent performer mic. fan, and handbook, spare 6KD6s, $360. Home brew PS, unused, all new parts, 500V 300 mA, 280V, 255V reg 150V reg., $40. SCR 522 Tx for 2m, $15. VK3ZB, QTHR. Ph. (03) 45 2295 A.H.

Galaxy V Transceiver, 80m-10m, complete, very comprehensive metered protected power supply, VOX, xtal calibrator, mic., spare tubes, CKT, handbook, $380. Philips 1677 Transceivers, 2m converted, Ch 1, Ch 4 xtals, CKT, handbook, mic., cradle, cables, $100. Identical unit, unconverted, as above, complete, all 2m coils etc., $50. VK3BCL, QTHR. Ph. (03) 49 4246.

WANTED

Morse Keys, homebrew or commercial, hand, "bug" or electronic, any type from early telegraph to present, any condition. Write VK4SS, 35 Whynot St., West End, Brisbane, Qld. 4101.

Blower Fan for Yaesu FT101. Please write by airmail to T. Connell, P.O. Box 718, Madang, P.N.G.

Butterfly Capacitors for 2 and 6 metre transmitters (valve) and 6LQ6 valves. Bob Black VK2BBR, P.O. Box 349, Lismore 2480. Ph. (066) 21 4384 Bus.

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YAESU

MINI-MOBILE/BASE STATION FT-75B

FT-75B. High power, for General use.

FT-75BS. Low power, for Novice use.

FT-75B, inc. one crystal for each band 3565, 7085, 14,200, 21400 28550 kHz, mic. & inst. book **$268**

FT-75B, inc. crystals for 3565, 7085, 14200, 21175, 27125 kHz, mic. inst. book **$258**

FV-50 optional VFO **$65**
FP-75B or **BS**, AC PSU **$68**

DC-75B or **BS** DC PS, inc. mobile mounting bracket **$74**

COMPACT 120 WATT thru 10 METRE TRANSCEIVER

Even the compact and sports car enthusiast can enjoy all band, SSB mobile operation, with the FT-75B "Mini-Mobile" transceiver. Features in one compact case are a 120 Watt transmitter with provision for three, variable crystal controlled frequencies on each band; as well as provision for external VFO operation.

The FT-75B is all solid state except for the final and driver stages and includes a built-in noise blanker and squelch circuit for quiet channel monitoring. The compact and squelch low stand-by current drain of only 300 mA., give the FT-75B the flexibility required in even the most demanding, compact installations.

The FT-75BS has one final tube removed and PS transformer tapped to reduce power to approx. 30W PEP output. When full call is obtained the set can be re-modified back to original condition.

TECHNICAL DATA — FT-75B

GENERAL

Frequency Range: 80 M 75 KHz segment within 3.5–4.0 MHz, 40 M 100 KHz segment within 7.0–7.5 MHz, 20 M 150 KHz segment within 14.0–14.5 MHz, 15 M 240 KHz segment within 21.0–21.5 MHz and 10 M 400 KHz segment within 28.0–30.0 MHz.

Mode: Upper Sideband for 20, 15 and 10 meter bands. Lower Sideband for 80 and 40 meter bands. CW for all bands.

Frequency Control: Crystal control VXO with 3 channels per band.

VXO Coverage: ±3 KHz for 80 M, ±3 KHz for 40 M, ±3 KHz for 20 M, ±5 KHz for 15 M and ±6 KHz for 10 M.

Antenna Impedance: 50 Ohm unbalanced.

Circuitry: 16 Transistors, 7 FET, 23 Diodes and 3 Tubes.

Power Requirement: External power Supply FP-75B for 100/110/117/200/220/234 V AC, 50/60 Hz, or DC-75B for 13.5 V DC.

Size: 210(W) x 80(H) x 300(D) m/m.

Weight: 3.8 Kg.

RECEIVER

Sensitivity: 0.5 μV for 10 dB Noise plus Signal to Noise Ratio on 14 MHz for SSB and CW.

Selectivity: 2.3 KHz nominal bandwidth at 6 dB down, 4.5 KHz at 60 dB down on SSB and CW.

Harmonic & Other Spurious Response: Image Rejection better than 50 dB. Internal Spurious Signal below 1 μV equivalent to antenna input.

Automatic Gain Control: AGC threshold nominal 1 μV. Attack time 5 millisecond and release time 1.5 seconds.

Audio Output: 2 Watts at 4 Ohm impedance.

Audio Distortion: Less than 10% at 2 Watts output.

TRANSMITTER

Input Power: 120 Watts PEP on SSB and 100 Watts on CW at 50% duty cycle. (Slightly lower on 10 meter.)

Microphone: 50 K Ohm dynamic type.

Carrier Suppression: −40 dB.

Sideband Suppression: −40 dB.

Spurious Radiation: −40 dB.

Distortion: −30 dB.

Frequency Response: 350 to 2700 Hz ±3 dB.

Final Tube: 12GB7 x 2.

ATTENTION! Yaesu Co. have advised a correction to the specifications of their YP-150 advertised in Sept. AR. The upper frequency of the YP-150 is 200 MHz, not 500 MHz as originally stated.

All prices include S.T., Freight extra. Prices and specifications subject to change. **90 DAY WARRANTY**

bail **ELECTRONIC SERVICES** **60 Shannon St., Box Hill North, Vic., 3129.** **Ph. 89-2213**

QLD. MITCHELL RADIO CO., 59 Albion Road, Albion, 4010 Ph 57 6830
N.S.W. STEPHEN KUHL, P.O. Box 56, Mascot, 2020 Ph Day 667 1650 A.H. 371 5445
S.A. FARMERS RADIO PTY. LTD., 257 Angas Street, Adelaide, 5000. Ph 23 1268
W A H. R. PRIDE, 26 Lockhart Street, Como, 6152 Ph 60 4379